PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-368282

(43)Date of publication of application : 20.12.2002

(51)Int.Cl. H01L 33/00
B41M 5/26
H01S 3/00

(21)Application number : 2001-169857

(22)Date of filing : 05.06.2001

(71)Applicant : SONY CORP

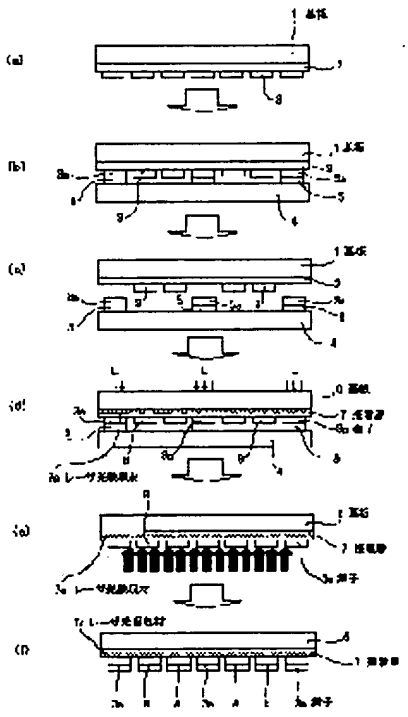
(72)Inventor : HAYASHI KUNIHIKO
YANAGISAWA YOSHIYUKI
IWABUCHI TOSHIAKI
OBA HIROSHI

(54) METHOD OF TRANSFERRING ELEMENT AND METHOD OF ARRANGING ELEMENT USING THE SAME, AND METHOD OF MANUFACTURING IMAGE DISPLAY

(57)Abstract:

PROBLEM TO BE SOLVED: To efficiently and precisely transfer an element to be transferred with reliability, without influencing other elements.

SOLUTION: By having laser light irradiated from the rear face side of a substrate, an adhesive layer located at an element to be transferred can be heated selectively. Furthermore, by including a light absorbing material for increasing the laser light absorption rate of the adhesive layer in the adhesive layer, or by disposing it near the adhesive layer, the adhesive layer located at the element to be transferred is made to absorb more laser light and thereby to be efficiently heated selectively. Consequently, the element to be transferred can be transferred efficiently and precisely with certainty.



LEGAL STATUS

[Date of request for examination] 19.03.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

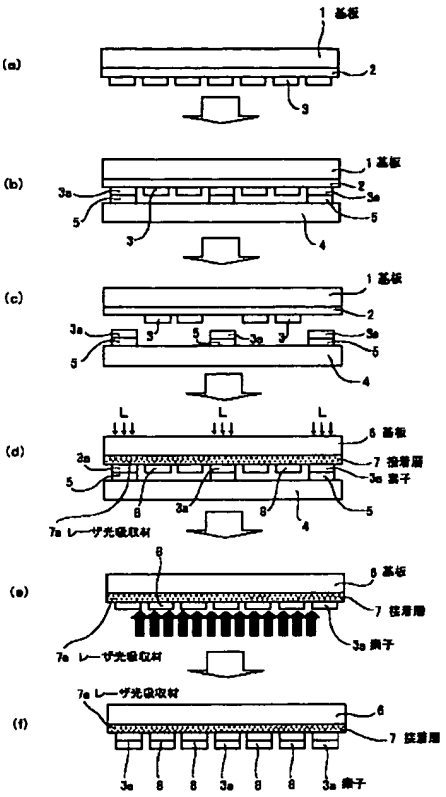
[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Drawing selection [Representative drawing]



[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the imprint approach of a component of pasting up said component which irradiates a laser beam through the second substrate with which the glue line was formed in the component arranged on the first substrate, heats alternatively said glue line on said second substrate, and serves as a candidate for an imprint on said second substrate The imprint approach of the component characterized by making said glue line contain the light absorption material which raises the absorption coefficient of said glue line to said laser beam, or making it arrange near said glue line.
[Claim 2] Said light absorption material is the imprint approach of the component according to claim 1 characterized by consisting of a particle or a thin film.
[Claim 3] Said light absorption material is the imprint approach of the component according to claim 1 characterized by being arranged in either or the plurality of said second substrate side front face of the adhesion side of the component used as said candidate for an imprint, the component side front face set as said imprint object of said glue line, the halfway section of said glue line, or said glue line.
[Claim 4] Said laser beam is the imprint approach of the component according to claim 1 characterized by irradiating from the background of said second substrate.
[Claim 5] The imprint approach of the component according to claim 1 characterized by irradiating said laser beam at the glue line of the location corresponding to the component used as said candidate for an imprint, and heating this glue line.
[Claim 6] The imprint approach of the component according to claim 1 characterized by irradiating the component used as said candidate for an imprint, heating said laser beam, and heating the glue line of the location corresponding to this component.
[Claim 7] The imprint approach of the component according to claim 1 characterized by irradiating said laser beam, heating it to wiring on said second substrate, and heating the glue line on this wiring.
[Claim 8] Said glue line is the imprint approach of the component according to claim 1 characterized by consisting of thermoplastic adhesion resin or thermosetting adhesion resin.
[Claim 9] In the array approach of the component which carries out the rearrangement of two or more components arranged on the first substrate on the second substrate The first imprint

process which said component is imprinted [process] and makes this component hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said component was arranged on said first substrate, The process separated for every component after hardening said component held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, The array approach of the component characterized by having the second imprint process which imprints said component used as the candidate for an imprint which irradiated the laser beam through said second substrate at said component, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin to said second substrate.

[Claim 10] Said light absorption material is the array approach of the component according to claim 9 characterized by consisting of a particle or a thin film.

[Claim 11] Said light absorption material is the array approach of the component according to claim 9 characterized by being arranged in either or the plurality of said second substrate side front face of the adhesion side of the component used as said candidate for an imprint, the component side front face set as said imprint object of said glue line, the halfway section of said glue line, or said glue line.

[Claim 12] Said laser beam is the array approach of the component according to claim 9 characterized by irradiating from the background of said second substrate.

[Claim 13] The array approach of a component according to claim 9 that distance which the distance made to estrange at said first imprint process is the abbreviation integral multiple of the pitch of the component arranged on said first substrate, and is made to estrange at said second imprint process is characterized by being the abbreviation integral multiple of a pitch at the component which the member for maintenance was made to arrange at said first imprint process temporarily [said].

[Claim 14] Said component is the array approach of the component according to claim 9 characterized by being the semiconductor device which used the nitride semi-conductor.

[Claim 15] Said component is the array approach of the component according to claim 9 characterized by being the component chosen from the light emitting device, liquid crystal controlling element, photoelectrical exchange component, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component, or its part.

[Claim 16] In the manufacture approach of the image display device which has arranged the light emitting device in the shape of a matrix The first imprint process which said light emitting device is imprinted [process] and makes this light emitting device hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said light emitting device was arranged on said first substrate, The process separated for every light emitting device after hardening said light emitting device held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light

absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, Irradiate a laser beam through said second substrate at said light emitting device, and said glue line on said second substrate is heated alternatively. The manufacture approach of the image display device characterized by having the second imprint process which imprints said light emitting device used as the candidate for an imprint which was held temporarily [said] at the substrate for maintenance, and was hardened by resin to said second substrate.

[Claim 17] Said light absorption material is the manufacture approach of the image display device according to claim 16 characterized by consisting of a particle or a thin film.

[Claim 18] Said light absorption material is the manufacture approach of the image display device according to claim 16 characterized by being arranged in either or the plurality of said second substrate side front face of the adhesion side of the component used as said candidate for an imprint, the component side front face set as said imprint object of said glue line, the halfway section of said glue line, or said glue line.

[Claim 19] Said laser beam is the manufacture approach of the image display device according to claim 16 characterized by irradiating from the background of said second substrate.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the array approach of the component which imprints further the component by which applied this imprint approach and micro processing was carried out to a larger field, and the manufacture approach of an image display device about the imprint approach of the component which imprints components, such as a semi-conductor light emitting device.
[0002]
[Description of the Prior Art] When arranging a light emitting device in the shape of a matrix and finishing setting up to an image display device conventionally, forming a component on a substrate like a liquid crystal display (LCD:Liquid Crystal Display) or a plasma display (PDP:Plasma Display Panel), or arranging the LED package of a simple substance like a light emitting diode display (LED display) is performed. In the conventional LED and the image display device like PDP, about the pitch and its manufacture process of a component or a pixel, since isolation is not made, it is usually performed from the beginning of a manufacture process that each component vacates only the pixel pitch of the image display device, and forms spacing. On the other hand, in the case of a LED display, an LED chip is usually taken out after dicing, it connects with an external electrode by bump connection by wire bond or the flip chip according to an individual, and being package-ized is performed. In this case, it is arranged by the pixel pitch as an image display device in front of package-izing or in the back.
[0003] Since LED (light emitting diode) which is a light emitting device is expensive, it can manufacture the image display device using LED to low cost by manufacturing much LED chips from one wafer. That is, about 300-micrometer thing is conventionally made the LED chip of dozens of micrometer angle for an LED chip size, and if it is mounted and an image display device is manufactured, the price of an image display device can be lowered.
[0004] then, each component -- a degree of integration -- techniques, such as a thin film replica method which form highly, and it is made to move, making a large field estrange each component by imprint etc., and there is a technique which constitutes comparatively big displays, such as an image display device, for example, is indicated by United States patent No.5438241, and the formation approach of the transistor array panel for a display indicated

by JP,11-142878,A, are known. In United States patent No.5438241, after indicating the imprint approach by which the component densely formed on the substrate is rearranged at **, getting down and imprinting a component to an elasticity substrate with adhesives, an elasticity substrate is elongated in x directions and the direction of y, acting as the monitor of spacing and the location of each component. And each component on the elongated substrate is imprinted on a necessary display panel. Moreover, with the technique indicated by JP,11-142878,A, the whole imprint of the thin film transistor which constitutes the liquid crystal display section on the first substrate is carried out on the second substrate, and the technique alternatively imprinted from the second substrate to the third substrate corresponding to a pixel pitch next is indicated.

[0005]

[Problem(s) to be Solved by the Invention] When manufacturing an image display device with the above imprint techniques, the component used as the candidate for an imprint needs to be imprinted alternatively and certainly. Moreover, an efficient imprint and an accurate imprint are also required. As an approach of carrying detailed electronic parts, and an electron device and the electronic parts which embedded them further at an insulator like plastics on a mounting substrate, the method of using thermoplastics as adhesives is common. For example, thermoplastics is applied to the need part of a mounting substrate, and electronic parts are placed on it. Then, it heats the whole substrate, adhesives are softened, and it cools after that, and fixes to a substrate. Or as other approaches, thermoplastics is applied all over a substrate, electronic parts are placed on it, and it heats the whole substrate, and subsequently adhesives are softened, it cools and fixes, and the method of removing the adhesives exposed by etching or plasma treatment, and acquiring the same structure is also learned after that.

[0006] However, when such an approach is used, when placing electronic parts, the activity which it places one [at a time] regularly is needed, and a location gap, exfoliation, etc. of other components by complete heating of about [being very complicated] and a substrate become a problem. For example, the method of imprinting from a substrate to a substrate, in arranging the components of an imprinting agency to a substrate altogether by arrangement as it is is possible, and when using thermoplastics, it is possible to expose the whole surface to a RF or a necessary ambient atmosphere, to heat it, to generate adhesive strength stronger than the adhesive strength to the substrate of an imprinting agency, and to imprint to a substrate side.

[0007] However, this is applied, and although it is also possible to imprint components to imprint and components not to imprint alternatively, since it is difficult to heat desired components, it has not resulted in practical use with the existing technique. Furthermore, in the existing complete heating, if thermoplastics is applied to an excessive part, the installation location of components may change with a fluidity at the time of heating. Therefore, it will be necessary to apply resin to the location on which components are generally put beforehand, and the complicatedness of placing one at a time as mentioned above cannot be canceled. Although the method of similarly taking out electronic parts from an imprinting agency once using an adsorption head etc., and placing on a substrate is also considered, when it fixes to a substrate from an adsorption head and complete heating is performed, there is a possibility that already pasted-up another components may exfoliate.

[0008] Moreover, by the approach of heating completely with laser, when thermoplastics and components do not have the high absorption coefficient of a laser beam, they have the problem that it is not heated by desired extent. Moreover, in the case where heating surfaces are components, there is a problem that thermal resistance is needed for the components itself. And if it heats completely using laser, the need of choosing the wavelength of laser with the rate of light absorption high about either or two or more members of wiring on thermoplastics, components, and a substrate will arise.
[0009] This invention is proposed in view of this conventional actual condition, can imprint certainly the component which serves as a candidate for an imprint among the components on a substrate, and aims at offering the array approach of a component, and the manufacture approach of an image display device further for the purpose of offering the imprint approach of the component which can imprint a component with an efficiently and sufficient precision.
[0010]
[Means for Solving the Problem] For the component arranged on the first substrate, the imprint approach of the component of this invention irradiates a laser beam through the second substrate with which the glue line was formed, and heats alternatively said glue line on said second substrate. In the imprint approach of a component of pasting up said component used as the candidate for an imprint on said second substrate, it is characterized by making a glue line contain the light absorption material which raises the absorption coefficient of said glue line to a laser beam, or making it arrange near the glue line.
[0011] Direct or the glue line which has the component of the request which is a candidate for an imprint indirectly through a component or wiring can be heated alternatively, without heating the glue line near [other than the component which is a candidate for an imprint by irradiating a laser beam from a substrate rear-face side] the component according to this invention. Furthermore, by making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam, or making it arrange near the glue line, a glue line with the component of the request which is a candidate for an imprint can be made to be able to absorb a laser beam much more well, and the glue line can be heated much more well. Therefore, a glue line with the component of the request which is a candidate for an imprint can be heated alternatively efficiently.
[0012] Furthermore, since it does not result in the component from which a laser beam is absorbed by light absorption material with the high absorption coefficient of a laser beam, and a laser beam serves as a candidate for an imprint by it, a laser beam can avoid hurting one's component used as the candidate for an imprint. Therefore, the various classes and wavelength of laser without the ingredient and relation of a component can be selected, without taking into consideration that a laser beam hurts its component.
[0013] Moreover, by choosing a known absorption property [of a laser beam] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of a laser beam as an ingredient of a component can be selected.

[0014] In the array approach of the component which carries out the rearrangement of two or more components with which the array approach of the component of this invention was arranged on the first substrate on the second substrate The first imprint process which said component is imprinted [process] and makes this component hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said component was arranged on said first substrate, The process separated for every component after hardening said component held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said component used as the candidate for an imprint which irradiated the laser beam through said second substrate at said component, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0015] In the array approach of the above-mentioned component, since the glue line near the component which serves as a candidate for an imprint using the above-mentioned imprint approach can be heated efficiently and certainly, an imprint is ensured [efficiently and] and the expansion imprint which enlarges distance between components can be carried out smoothly.

[0016] In the manufacture approach of an image display device that the manufacture approach of the image display device of this invention has arranged the light emitting device in the shape of a matrix The first imprint process which said light emitting device is imprinted [process] and makes this light emitting device hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said light emitting device was arranged on said first substrate, The process separated for every light emitting device after hardening said light emitting device held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said light emitting device used as the candidate for an imprint which irradiated the laser beam through said second substrate at said light emitting device, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0017] According to the manufacture approach of the above-mentioned image display device, by the above-mentioned imprint approach and the array approach, a light emitting device is arranged in the shape of a matrix, and an image display part is constituted. Therefore, since the glue line near the component used as the candidate for an imprint can be heated efficiently and certainly, an imprint can be ensured [efficiently and], it is made high, dense condition, i.e., degree of integration, and the light emitting device created by performing micro processing can be estranged efficiently, and can be rearranged, and productivity is improved

sharply.
[0018]
[Embodiment of the Invention] Hereafter, the imprint approach of the component which applied this invention, the array approach, and the manufacture approach of an image display device are explained to a detail, referring to a drawing. In addition, the case where the light absorption material which raises the absorption coefficient of the glue line to a laser beam to a glue line in this operation gestalt is made to contain is explained.
[0019] Moreover, there are particle-like ingredients, such as a metal membrane which consists of chromium which is a thin film, aluminum, etc. as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line or carbon black, and a calcium carbonate. When the light absorption material which raises the absorption coefficient of the glue line to a laser beam is a metaled thin film, you may form in an adhesion side of a component, a front face of a glue line, etc. used as the candidate for an imprint, and a glue line may be made to contain in the case of a particle-like ingredient, or you may make it form in it on the surface of a component.
[0020] First, the imprint approach of a basic component is explained. In order to imprint a component by this invention, as shown in drawing 1 (a), a glue line 2 is formed on the substrate 1 which becomes an imprinting agency, and array formation of two or more components 3 is carried out on this.
[0021] Here, it becomes possible by using adhesive resin with adhesion small for example comparatively etc. for the above-mentioned glue line 2 to imprint to other substrates simply.
[0022] Moreover, if it can apply to the component of arbitration and illustrates as a component 3, a light emitting device, liquid crystal controlling element, photoelectrical exchange component, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component etc. can be mentioned.
[0023] Subsequently, as shown in drawing 1 (b), the substrate 4 for maintenance (the first substrate) is stuck by pressure temporarily which counters with this substrate 1 and becomes mediation of an imprint, and this component 3 required on the substrate 4 for maintenance temporarily is copied alternatively.
[0024] On the substrate 4 for maintenance, the glue line 5 is alternatively formed corresponding to component 3a used as the candidate for an imprint at the time of top Norikazu, and adhesion of this glue line 5 is made larger than the adhesion of the glue line 2 on a substrate 1. Thus, by making adhesion of a glue line 5 larger than the adhesion of the glue line 2 on a substrate 1, component 3a can be imprinted easily. Drawing 1 (c) shows the condition of removing the substrate 4 for maintenance from the substrate 1 temporarily, and component 3a is imprinted on the glue line 5 formed alternatively.
[0025] Next, as shown in drawing 1 (d), the substrate 4 for maintenance is made to counter with the imprint substrate (the second substrate) 6 temporarily which copied this component 3a, it is stuck by pressure, and component 3a is shifted to the imprint substrate 6 side. The glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue

line to a laser beam is formed in the whole surface, and 8 near the component 3a is already being fixed to the front face of the above-mentioned imprint substrate 6. The glue line 7 containing 7a which raises the absorption coefficient of the glue line to a laser beam is formed by applying for example, thermoplastic adhesion resin. Moreover, since the above-mentioned imprint substrate 6 needs to irradiate a laser beam from the rear-face side of this imprint substrate 6 at the time of the imprint of component 3a, it is desirable to have light transmission nature.

[0026] After laying the substrate 4 for maintenance on top of the above-mentioned imprint substrate 6 on the occasion of an imprint temporarily, laser beam L is irradiated from the rear-face side of the imprint substrate 6, the above-mentioned glue line 7 is hardened alternatively, and component 3a is fixed to a glue line 7 by carrying out cooling hardening after that.

[0027] For example, as shown in drawing 2 , laser beam L is irradiated from the rear-face side of the imprint substrate 6, and the above-mentioned glue line 7 of the part which component 3a used as the candidate for an imprint touches is heated alternatively. Then, although the heating field H of a glue line 7 which consists of thermoplastic adhesion resin hardens and adhesive strength is demonstrated to component 3a, since light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L is contained, a glue line with component 3a can absorb laser beam L better, and can heat the glue line better. Therefore, a glue line with component 3a of the request which is a candidate for an imprint can be heated alternatively efficiently, and a glue line with component 3a can be heated alternatively efficiently.

[0028] Moreover, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and laser beam L resulting in component 3a by it.

[0029] Then, if cooling hardening of a stop and the above-mentioned heating field H is carried out for the exposure of laser beam L, component 3a is fixed to the imprint substrate 6 by the glue line 7. Since light absorption material 7a which raises the rate of light absorption of the glue line 7 to laser beam L to a glue line 7 contains at this time, the glue line which makes that light absorption material 7a absorb laser beam L, and has component 3a can be heated alternatively efficiently. And the time amount by which laser beam L is irradiated by component 3a with efficient heating of a glue line with component 3a is short, and neither exfoliation nor a location gap arises for other components 8, without affecting the fixing condition of other components 8, since a glue line with other components 8 is not heated.

[0030] Although heating of the glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L was performed to the glue line 7 by irradiating direct laser beam L in the above-mentioned example When it is difficult to heat a glue line 7 directly by laser beam L, as shown in drawing 3 , it is also possible to heat a glue line 7 indirectly by irradiating laser beam L which penetrated the glue line 7 at component 3a used as the candidate for an imprint, and heating this.

[0031] In such a case, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a by it by making a glue line 7

contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam like light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, or making it arrange near the glue line 7.

[0032] Laser beam L is irradiated at component 3a used as the candidate for an imprint, and if the part H which touches the above-mentioned glue line 7 is heated, the heat will get across to a glue line 7, and will soften this. If the rest carries out cooling hardening of this, component 3a is fixed to the imprint substrate 6 by the above-mentioned glue line 7.

[0033] Or it is [0034], although it is also possible to heat this by laser radiation and to heat a glue line 7 indirectly when wiring is formed on the imprint substrate 6. Also in such a case, it can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a or wiring by it like ****.

[0035] A circuit pattern 9 is formed on the imprint substrate 6, and drawing 4 shows the example which imprints component 3a on this. Usually, corresponding to component 3a, the circuit pattern 9 for connecting component 3a and a circuit concerned is formed. A circuit pattern 9 consists of metals, such as copper and aluminum, and can be easily heated by laser beam L.

[0036] Then, as shown in drawing 4 , laser beam L is irradiated at the circuit pattern 9 prepared corresponding to component 3a, and the field H corresponding to component 3a is overheated. Then, the heat gets across to a glue line 7, and softens this. The rest is the same, and if cooling hardening of this is carried out, component 3a is fixed to the imprint substrate 6 by the glue line 7.

[0037] In addition, heating shown in above-mentioned drawing 2 thru/or drawing 4 may be performed independently, respectively, or a glue line 7 heats and you may make it these compound and soften finally by the exposure of laser beam L.

[0038] After fixing component 3a to the imprint substrate 6 by the glue line 7 through heating softening by the above-mentioned laser beam exposure, and hardening by cooling, the substrate 4 for momentary maintenance is exfoliated.

[0039] Although component 3a used as the candidate for an imprint is imprinted on the imprint substrate 6 by this, a glue line 7 is formed in the whole surface in this condition.

[0040] Then, it etches, as shown in drawing 1 (e), and the excessive part of a glue line 7 is removed, and a selection imprint process is completed. Thereby, component 3a as shown in drawing 1 (f) can obtain the imprint substrate 6 by which the selection imprint was carried out between components 8.

[0041] As mentioned above, it becomes possible to imprint component 3a alternatively, without these-adjoining and effect attaining to the fixing condition of the adhesion component 8, in order not to tell heat even to the glue line 7 which has fixed the component 8 which became possible [heating the very narrow part of a glue line 7 by using laser beam L for a short time], and was already pasted up adjacently.

[0042] Thus, adhesion near the component 3a can be made to absorb laser beam L much more well by making a glue line 7 contain the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L like light absorption material 7a which raises the

absorption coefficient of the glue line 7 to laser beam L. Therefore, the glue line can be heated much more well, and a glue line with component 3a can be heated alternatively efficiently.
[0043] Furthermore, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a by it. The various classes and wavelength of laser without the ingredient and relation of component 3a can be selected without taking into consideration that the light absorption material with the high absorption coefficient of this laser beam L feels a pain [a / component 3] for laser beam L resulting in component 3a by laser beam L since it protects and laser beam L does not result in component 3a.
[0044] Moreover, by choosing a known absorption property [of laser beam L] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of laser beam L as an ingredient of component 3a can be selected.
[0045] In addition, in the above explanation, although thermoplastic adhesion resin was made into the example and explained as an ingredient which constitutes a glue line 7, the alternative imprint of a component is possible also for thermosetting adhesion resin by the same technique. In the case of thermosetting adhesion resin, the part heated by the exposure of laser beam L heat-hardens, and a component is fixed in it.
[0046] Moreover, drawing 5 is the case where the glue line 7 which is made to arrange in a glue line 7 side front face light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and has component 7a which is a candidate for an imprint is heated. It can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a or wiring by it like the case where light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L to a glue line 7 also in this case is made to contain.
[0047] If the above-mentioned imprint approach is applied to the component imprint in the image display device of an active matrix etc., it is very useful. It is necessary to adjoin Si transistor which is a driver element and to arrange the light emitting device of R, G, and B in the image display device of an active matrix. Although it is necessary to imprint the light emitting device of these R, G, and B one by one in the location where Si transistor is near, Si transistor will lead to breakage of an internal circuitry, if heat conduction is very good and heat is added.

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the array approach of the component which imprints further the component by which applied this imprint approach and micro processing was carried out to a larger field, and the manufacture approach of an image display device about the imprint approach of the component which imprints components, such as a semi-conductor light emitting device.
[0002]
[Description of the Prior Art] When arranging a light emitting device in the shape of a matrix and finishing setting up to an image display device conventionally, forming a component on a substrate like a liquid crystal display (LCD:Liquid Crystal Display) or a plasma display (PDP:Plasma Display Panel), or arranging the LED package of a simple substance like a light emitting diode display (LED display) is performed. In the conventional LED and the image display device like PDP, about the pitch and its manufacture process of a component or a pixel, since isolation is not made, it is usually performed from the beginning of a manufacture process that each component vacates only the pixel pitch of the image display device, and forms spacing. On the other hand, in the case of a LED display, an LED chip is usually taken out after dicing, it connects with an external electrode by bump connection by wire bond or the flip chip according to an individual, and being package-ized is performed. In this case, it is arranged by the pixel pitch as an image display device in front of package-izing or in the back.
[0003] Since LED (light emitting diode) which is a light emitting device is expensive, it can manufacture the image display device using LED to low cost by manufacturing much LED chips from one wafer. That is, about 300-micrometer thing is conventionally made the LED chip of dozens of micrometer angle for an LED chip size, and if it is mounted and an image display device is manufactured, the price of an image display device can be lowered.
[0004] then, each component -- a degree of integration -- techniques, such as a thin film replica method which form highly, and it is made to move, making a large field estrange each component by imprint etc., and there is a technique which constitutes comparatively big displays, such as an image display device, for example, is indicated by United States patent No.5438241, and the formation approach of the transistor array panel for a display indicated

by JP,11-142878,A, are known. In United States patent No.5438241, after indicating the imprint approach by which the component densely formed on the substrate is rearranged at **, getting down and imprinting a component to an elasticity substrate with adhesives, an elasticity substrate is elongated in x directions and the direction of y, acting as the monitor of spacing and the location of each component. And each component on the elongated substrate is imprinted on a necessary display panel. Moreover, with the technique indicated by JP,11-142878,A, the whole imprint of the thin film transistor which constitutes the liquid crystal display section on the first substrate is carried out on the second substrate, and the technique alternatively imprinted from the second substrate to the third substrate corresponding to a pixel pitch next is indicated.

[0005]

[Problem(s) to be Solved by the Invention] When manufacturing an image display device with the above imprint techniques, the component used as the candidate for an imprint needs to be imprinted alternatively and certainly. Moreover, an efficient imprint and an accurate imprint are also required. As an approach of carrying detailed electronic parts, and an electron device and the electronic parts which embedded them further at an insulator like plastics on a mounting substrate, the method of using thermoplastics as adhesives is common. For example, thermoplastics is applied to the need part of a mounting substrate, and electronic parts are placed on it. Then, it heats the whole substrate, adhesives are softened, and it cools after that, and fixes to a substrate. Or as other approaches, thermoplastics is applied all over a substrate, electronic parts are placed on it, and it heats the whole substrate, and subsequently adhesives are softened, it cools and fixes, and the method of removing the adhesives exposed by etching or plasma treatment, and acquiring the same structure is also learned after that.

[0006] However, when such an approach is used, when placing electronic parts, the activity which it places one [at a time] regularly is needed, and a location gap, exfoliation, etc. of other components by complete heating of about [being very complicated] and a substrate become a problem. For example, the method of imprinting from a substrate to a substrate, in arranging the components of an imprinting agency to a substrate altogether by arrangement as it is is possible, and when using thermoplastics, it is possible to expose the whole surface to a RF or a necessary ambient atmosphere, to heat it, to generate adhesive strength stronger than the adhesive strength to the substrate of an imprinting agency, and to imprint to a substrate side.

[0007] However, this is applied, and although it is also possible to imprint components to imprint and components not to imprint alternatively, since it is difficult to heat desired components, it has not resulted in practical use with the existing technique. Furthermore, in the existing complete heating, if thermoplastics is applied to an excessive part, the installation location of components may change with a fluidity at the time of heating. Therefore, it will be necessary to apply resin to the location on which components are generally put beforehand, and the complicatedness of placing one at a time as mentioned above cannot be canceled. Although the method of similarly taking out electronic parts from an imprinting agency once using an adsorption head etc., and placing on a substrate is also considered, when it fixes to a substrate from an adsorption head and complete heating is performed, there is a possibility that already pasted-up another components may exfoliate.

[0008] Moreover, by the approach of heating completely with laser, when thermoplastics and components do not have the high absorption coefficient of a laser beam, they have the problem that it is not heated by desired extent. Moreover, in the case where heating surfaces are components, there is a problem that thermal resistance is needed for the components itself. And if it heats completely using laser, the need of choosing the wavelength of laser with the rate of light absorption high about either or two or more members of wiring on thermoplastics, components, and a substrate will arise.
[0009] This invention is proposed in view of this conventional actual condition, can imprint certainly the component which serves as a candidate for an imprint among the components on a substrate, and aims at offering the array approach of a component, and the manufacture approach of an image display device further for the purpose of offering the imprint approach of the component which can imprint a component with an efficiently and sufficient precision.
[0010]
[Means for Solving the Problem] For the component arranged on the first substrate, the imprint approach of the component of this invention irradiates a laser beam through the second substrate with which the glue line was formed, and heats alternatively said glue line on said second substrate. In the imprint approach of a component of pasting up said component used as the candidate for an imprint on said second substrate, it is characterized by making a glue line contain the light absorption material which raises the absorption coefficient of said glue line to a laser beam, or making it arrange near the glue line.
[0011] Direct or the glue line which has the component of the request which is a candidate for an imprint indirectly through a component or wiring can be heated alternatively, without heating the glue line near [other than the component which is a candidate for an imprint by irradiating a laser beam from a substrate rear-face side] the component according to this invention. Furthermore, by making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam, or making it arrange near the glue line, a glue line with the component of the request which is a candidate for an imprint can be made to be able to absorb a laser beam much more well, and the glue line can be heated much more well. Therefore, a glue line with the component of the request which is a candidate for an imprint can be heated alternatively efficiently.
[0012] Furthermore, since it does not result in the component from which a laser beam is absorbed by light absorption material with the high absorption coefficient of a laser beam, and a laser beam serves as a candidate for an imprint by it, a laser beam can avoid hurting one's component used as the candidate for an imprint. Therefore, the various classes and wavelength of laser without the ingredient and relation of a component can be selected, without taking into consideration that a laser beam hurts its component.
[0013] Moreover, by choosing a known absorption property [of a laser beam] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of a laser beam as an ingredient of a component can be selected.

[0014] In the array approach of the component which carries out the rearrangement of two or more components with which the array approach of the component of this invention was arranged on the first substrate on the second substrate The first imprint process which said component is imprinted [process] and makes this component hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said component was arranged on said first substrate, The process separated for every component after hardening said component held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said component used as the candidate for an imprint which irradiated the laser beam through said second substrate at said component, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0015] In the array approach of the above-mentioned component, since the glue line near the component which serves as a candidate for an imprint using the above-mentioned imprint approach can be heated efficiently and certainly, an imprint is ensured [efficiently and] and the expansion imprint which enlarges distance between components can be carried out smoothly.

[0016] In the manufacture approach of an image display device that the manufacture approach of the image display device of this invention has arranged the light emitting device in the shape of a matrix The first imprint process which said light emitting device is imprinted [process] and makes this light emitting device hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said light emitting device was arranged on said first substrate, The process separated for every light emitting device after hardening said light emitting device held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said light emitting device used as the candidate for an imprint which irradiated the laser beam through said second substrate at said light emitting device, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0017] According to the manufacture approach of the above-mentioned image display device, by the above-mentioned imprint approach and the array approach, a light emitting device is arranged in the shape of a matrix, and an image display part is constituted. Therefore, since the glue line near the component used as the candidate for an imprint can be heated efficiently and certainly, an imprint can be ensured [efficiently and], it is made high, dense condition, i.e., degree of integration, and the light emitting device created by performing micro processing can be estranged efficiently, and can be rearranged, and productivity is improved

sharply.
[0018]
[Embodiment of the Invention] Hereafter, the imprint approach of the component which applied this invention, the array approach, and the manufacture approach of an image display device are explained to a detail, referring to a drawing. In addition, the case where the light absorption material which raises the absorption coefficient of the glue line to a laser beam to a glue line in this operation gestalt is made to contain is explained.
[0019] Moreover, there are particle-like ingredients, such as a metal membrane which consists of chromium which is a thin film, aluminum, etc. as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line or carbon black, and a calcium carbonate. When the light absorption material which raises the absorption coefficient of the glue line to a laser beam is a metaled thin film, you may form in an adhesion side of a component, a front face of a glue line, etc. used as the candidate for an imprint, and a glue line may be made to contain in the case of a particle-like ingredient, or you may make it form in it on the surface of a component.
[0020] First, the imprint approach of a basic component is explained. In order to imprint a component by this invention, as shown in drawing 1 (a), a glue line 2 is formed on the substrate 1 which becomes an imprinting agency, and array formation of two or more components 3 is carried out on this.
[0021] Here, it becomes possible by using adhesive resin with adhesion small for example comparatively etc. for the above-mentioned glue line 2 to imprint to other substrates simply.
[0022] Moreover, if it can apply to the component of arbitration and illustrates as a component 3, a light emitting device, liquid crystal controlling element, photoelectrical exchange component, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component etc. can be mentioned.
[0023] Subsequently, as shown in drawing 1 (b), the substrate 4 for maintenance (the first substrate) is stuck by pressure temporarily which counters with this substrate 1 and becomes mediation of an imprint, and this component 3 required on the substrate 4 for maintenance temporarily is copied alternatively.
[0024] On the substrate 4 for maintenance, the glue line 5 is alternatively formed corresponding to component 3a used as the candidate for an imprint at the time of top Norikazu, and adhesion of this glue line 5 is made larger than the adhesion of the glue line 2 on a substrate 1. Thus, by making adhesion of a glue line 5 larger than the adhesion of the glue line 2 on a substrate 1, component 3a can be imprinted easily. Drawing 1 (c) shows the condition of removing the substrate 4 for maintenance from the substrate 1 temporarily, and component 3a is imprinted on the glue line 5 formed alternatively.
[0025] Next, as shown in drawing 1 (d), the substrate 4 for maintenance is made to counter with the imprint substrate (the second substrate) 6 temporarily which copied this component 3a, it is stuck by pressure, and component 3a is shifted to the imprint substrate 6 side. The glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue

line to a laser beam is formed in the whole surface, and 8 near the component 3a is already being fixed to the front face of the above-mentioned imprint substrate 6. The glue line 7 containing 7a which raises the absorption coefficient of the glue line to a laser beam is formed by applying for example, thermoplastic adhesion resin. Moreover, since the above-mentioned imprint substrate 6 needs to irradiate a laser beam from the rear-face side of this imprint substrate 6 at the time of the imprint of component 3a, it is desirable to have light transmission nature.

[0026] After laying the substrate 4 for maintenance on top of the above-mentioned imprint substrate 6 on the occasion of an imprint temporarily, laser beam L is irradiated from the rear-face side of the imprint substrate 6, the above-mentioned glue line 7 is hardened alternatively, and component 3a is fixed to a glue line 7 by carrying out cooling hardening after that.

[0027] For example, as shown in drawing 2 , laser beam L is irradiated from the rear-face side of the imprint substrate 6, and the above-mentioned glue line 7 of the part which component 3a used as the candidate for an imprint touches is heated alternatively. Then, although the heating field H of a glue line 7 which consists of thermoplastic adhesion resin hardens and adhesive strength is demonstrated to component 3a, since light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L is contained, a glue line with component 3a can absorb laser beam L better, and can heat the glue line better. Therefore, a glue line with component 3a of the request which is a candidate for an imprint can be heated alternatively efficiently, and a glue line with component 3a can be heated alternatively efficiently.

[0028] Moreover, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and laser beam L resulting in component 3a by it.

[0029] Then, if cooling hardening of a stop and the above-mentioned heating field H is carried out for the exposure of laser beam L, component 3a is fixed to the imprint substrate 6 by the glue line 7. Since light absorption material 7a which raises the rate of light absorption of the glue line 7 to laser beam L to a glue line 7 contains at this time, the glue line which makes that light absorption material 7a absorb laser beam L, and has component 3a can be heated alternatively efficiently. And the time amount by which laser beam L is irradiated by component 3a with efficient heating of a glue line with component 3a is short, and neither exfoliation nor a location gap arises for other components 8, without affecting the fixing condition of other components 8, since a glue line with other components 8 is not heated.

[0030] Although heating of the glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L was performed to the glue line 7 by irradiating direct laser beam L in the above-mentioned example When it is difficult to heat a glue line 7 directly by laser beam L, as shown in drawing 3 , it is also possible to heat a glue line 7 indirectly by irradiating laser beam L which penetrated the glue line 7 at component 3a used as the candidate for an imprint, and heating this.

[0031] In such a case, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a by it by making a glue line 7

contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam like light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, or making it arrange near the glue line 7.

[0032] Laser beam L is irradiated at component 3a used as the candidate for an imprint, and if the part H which touches the above-mentioned glue line 7 is heated, the heat will get across to a glue line 7, and will soften this. If the rest carries out cooling hardening of this, component 3a is fixed to the imprint substrate 6 by the above-mentioned glue line 7.

[0033] Or it is [0034], although it is also possible to heat this by laser radiation and to heat a glue line 7 indirectly when wiring is formed on the imprint substrate 6. Also in such a case, it can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a or wiring by it like ****.

[0035] A circuit pattern 9 is formed on the imprint substrate 6, and drawing 4 shows the example which imprints component 3a on this. Usually, corresponding to component 3a, the circuit pattern 9 for connecting component 3a and a circuit concerned is formed. A circuit pattern 9 consists of metals, such as copper and aluminum, and can be easily heated by laser beam L.

[0036] Then, as shown in drawing 4 , laser beam L is irradiated at the circuit pattern 9 prepared corresponding to component 3a, and the field H corresponding to component 3a is overheated. Then, the heat gets across to a glue line 7, and softens this. The rest is the same, and if cooling hardening of this is carried out, component 3a is fixed to the imprint substrate 6 by the glue line 7.

[0037] In addition, heating shown in above-mentioned drawing 2 thru/or drawing 4 may be performed independently, respectively, or a glue line 7 heats and you may make it these compound and soften finally by the exposure of laser beam L.

[0038] After fixing component 3a to the imprint substrate 6 by the glue line 7 through heating softening by the above-mentioned laser beam exposure, and hardening by cooling, the substrate 4 for momentary maintenance is exfoliated.

[0039] Although component 3a used as the candidate for an imprint is imprinted on the imprint substrate 6 by this, a glue line 7 is formed in the whole surface in this condition.

[0040] Then, it etches, as shown in drawing 1 (e), and the excessive part of a glue line 7 is removed, and a selection imprint process is completed. Thereby, component 3a as shown in drawing 1 (f) can obtain the imprint substrate 6 by which the selection imprint was carried out between components 8.

[0041] As mentioned above, it becomes possible to imprint component 3a alternatively, without these-adjoining and effect attaining to the fixing condition of the adhesion component 8, in order not to tell heat even to the glue line 7 which has fixed the component 8 which became possible [heating the very narrow part of a glue line 7 by using laser beam L for a short time], and was already pasted up adjacently.

[0042] Thus, adhesion near the component 3a can be made to absorb laser beam L much more well by making a glue line 7 contain the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L like light absorption material 7a which raises the

absorption coefficient of the glue line 7 to laser beam L. Therefore, the glue line can be heated much more well, and a glue line with component 3a can be heated alternatively efficiently.
[0043] Furthermore, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a by it. The various classes and wavelength of laser without the ingredient and relation of component 3a can be selected without taking into consideration that the light absorption material with the high absorption coefficient of this laser beam L feels a pain [a / component 3] for laser beam L resulting in component 3a by laser beam L since it protects and laser beam L does not result in component 3a.
[0044] Moreover, by choosing a known absorption property [of laser beam L] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of laser beam L as an ingredient of component 3a can be selected.
[0045] In addition, in the above explanation, although thermoplastic adhesion resin was made into the example and explained as an ingredient which constitutes a glue line 7, the alternative imprint of a component is possible also for thermosetting adhesion resin by the same technique. In the case of thermosetting adhesion resin, the part heated by the exposure of laser beam L heat-hardens, and a component is fixed in it.
[0046] Moreover, drawing 5 is the case where the glue line 7 which is made to arrange in a glue line 7 side front face light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and has component 7a which is a candidate for an imprint is heated. It can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a or wiring by it like the case where light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L to a glue line 7 also in this case is made to contain.
[0047] If the above-mentioned imprint approach is applied to the component imprint in the image display device of an active matrix etc., it is very useful. It is necessary to adjoin Si transistor which is a driver element and to arrange the light emitting device of R, G, and B in the image display device of an active matrix. Although it is necessary to imprint the light emitting device of these R, G, and B one by one in the location where Si transistor is near, Si transistor will lead to breakage of an internal circuitry, if heat conduction is very good and heat is added. Here, by using the above-mentioned imprint approach, it can avoid that heat gets across to Si transistor, and can cancel above-mentioned un-arranging. For example, when each light emitting device is the small area the magnitude of the above-mentioned Si transistor is 560micrometerx160micrometerx35micrometer, and it is [area] about 5-10 micrometers per side, uses epoxy system thermosetting resin for a glue line and irradiates YAG2 double laser (wavelength of 532nm), heating by laser radiation is 4n second, and cooling is about 10n second. If the heating time by laser radiation is less than [10n second], the effect of heat will not attain to adjoining Si transistor.
[0048] Next, the array approach of the component by the two-step expansion replica method

and the manufacture approach of an image display device are explained as an application of the above-mentioned imprint approach. Two steps of expansion imprints which imprint to the member for maintenance temporarily so that it may be in the condition estranged the component which the array approach of the component of this example and the manufacture approach of an image display device had a high degree of integration, and was created on the first substrate rather than the condition that the component was arranged on the first substrate, estrange said component subsequently to the member for maintenance held temporarily to be carried out, and imprint it on the second substrate perform. In addition, although the imprint is made into two steps with this operation gestalt, an imprint can also be made into three steps or the multistage story beyond it according to whenever [expansion / which estranges and arranges a component].

[0049] Drawing 6 is drawing showing the fundamental process of a two-step expansion replica method, respectively. First, a component 12 like a light emitting device is densely formed on the first substrate 10 shown in (a) of drawing 6 . By forming a component densely, the number of the components generated by per each substrate can be made [many], and product cost can be lowered. Although for example, a semi-conductor wafer, a glass substrate, a quartz-glass substrate, a sapphire substrate, a plastic plate, etc. are substrates in which component formation is possible variously, the first substrate 10 may form each component 12 directly on the first substrate 10, and may arrange what was formed on other substrates.

[0050] Next, as shown in (b) of drawing 6 , each component 12 is imprinted from the first substrate 10 by the member 11 for maintenance temporarily which is shown by the drawing destructive line, and each component 12 is held on the member 11 for maintenance temporarily [this]. The component 12 which adjoins here is estranged and is allotted in the shape of a matrix like illustration. That is, a component 12 is imprinted so that between components may be extended also in the x directions, respectively, but it imprints so that between components may be extended also in the direction perpendicular to x directions of y, respectively. Especially the distance estranged at this time is not limited, but can be made into the distance which took into consideration resin section formation at a consecutive process, and formation of an electrode pad as an example. When it imprints from the first substrate 10 on the member 11 for maintenance temporarily, all the components on the first substrate 10 can be estranged and imprinted. In this case, the size of the member 11 for maintenance should just be more than the size that multiplied by the distance estranged in the number of the components 12 allotted in the shape of a matrix (x directions and the direction of y respectively) temporarily. Moreover, some components on the first substrate 10 are able to estrange and imprint on the member 11 for maintenance temporarily.

[0051] As shown in (c) of drawing 6 after such a first imprint process, since the component 12 which exists on the member 11 for maintenance temporarily is estranged, covering of the resin of the circumference of a component and formation of an electrode pad are performed every component 12. An electrode pad is made easy to form and covering of the resin of the circumference of a component is formed for making easy the handling by the following second imprint process etc. Since formation of an electrode pad is performed after the second imprint process which final wiring follows so that it may mention later, it is formed in comparatively

oversized size so that poor wiring may not arise in that case. In addition, the electrode pad is not illustrated to (c) of drawing 1 . The resin formation chip 14 is formed because resin 13 covers the surroundings of each component 12. On a flat surface, although a component 12 is located in the center of abbreviation of the resin formation chip 14, it may exist in the location which inclined toward the one side and angle side.

[0052] Next, as shown in (d) of drawing 6 , the second imprint process is performed. At this second imprint process, it imprints on the second substrate 15 so that the component 12 allotted in the shape of a matrix on the member 11 for maintenance temporarily may estrange further the whole resin formation chip 14.

[0053] Although the imprint approach shown in above-mentioned drawing 1 is applied to this second imprint process, this is explained in full detail a back forge fire.

[0054] Also in the second imprint process, the adjoining component 12 is estranged every resin formation chip 14, and is allotted in the shape of a matrix like illustration. That is, a component 12 is imprinted so that between components may be extended also in the x directions, respectively, but it imprints so that between components may be extended also in the direction perpendicular to x directions of y, respectively. Supposing the location of the component arranged by the second imprint process is a location corresponding to the pixel of final products, such as an image display device, the abbreviation integral multiple of the pitch between the original components 12 will serve as a pitch of the component 12 arranged by the second imprint process. When the dilation ratio of the estranged pitch in the member 11 for maintenance is set to n from the first substrate 10 here temporarily and the dilation ratio of the estranged pitch in the second substrate 15 is set to m from the member 11 for maintenance temporarily, the value E of an abbreviation integral multiple is E=n (expressed with m.). dilation ratios n and m -- respectively -- an integer -- you may be -- an integer -- not but -- ** -- E becomes an integer -- combining (it being m= 5 at n= 2.4) -- it is -- ****ing .

[0055] Wiring is given to each component 12 estranged every resin formation chip 14 on the second substrate 15. Wiring while obstructing a faulty connection as much as possible using the electrode pad formed previously at this time is made. As for this wiring, in the case of light emitting devices, such as light emitting diode, in the case of a liquid crystal controlling element, a component 12 includes a selection-signal line, an electrical-potential-difference line, wiring of an orientation electrode layer etc., etc. including wiring to p electrode and n electrode.

[0056] In the two-step expansion replica method shown in drawing 6 , although an electrode pad, resin hammer hardening, etc. can be performed using the tooth space estranged after the first imprint and wiring is given after the second imprint, wiring while obstructing a faulty connection as much as possible using the electrode pad formed previously is made. Therefore, the yield of an image display device can be raised. Moreover, in the two-step expansion replica method of this operation gestalt, the processes which estrange the distance between components are two processes, it is performing the expansion imprint of two or more processes which estrange the distance between such components, and the count of an imprint will become fewer in practice. Namely, if the dilation ratio of the estranged pitch in the member 11 for maintenance is set to 2 (n= 2) in part from the first substrate 10 here and the

dilation ratio of the estranged pitch in the second substrate 15 is set to 2 (m= 2) from the members 11 and 11a for maintenance for example, temporarily By the time of imprinting in the range temporarily expanded by the imprint once, the last dilation ratio is 2 (although the need of performing 16 imprints of the square, i.e., the alignment of the first substrate, 16 times arises in 4 times 2). The count of alignment can be managed only with a total of 8 times added simply [the square of the dilation ratio 2 in 4 times and the second imprint process of the square of the dilation ratio 2 in the first imprint process] 4 times with the two-step expansion replica method of this operation gestalt. That is, only 2nm time can surely reduce the count of an imprint from it being 2(n+m) =n2+2 nm+m2, when meaning the same imprint scale factor. Therefore, a production process also serves as saving of time amount or cost by the count, especially it becomes useful when a dilation ratio is large.

[0057] In addition, in the two-step expansion replica method shown in drawing 6 , although the component 12 is used as the light emitting device, you may be the component which was not limited to this but was chosen from the other components, for example, liquid crystal controlling element, optoelectric-transducer, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component or its part, such combination, etc.

[0058] In the above-mentioned second imprint process, although it is dealt with as a resin formation chip and the second substrate imprints from on the member for maintenance temporarily, this resin formation chip is explained with reference to drawing 7 and drawing 8 . The resin formation chip 20 is a briquette by resin 22 about the surroundings of the component 21 estranged and arranged, and when imprinting a component 21 from the member for maintenance to the second substrate temporarily, it can use such a resin formation chip 20.

[0059] As for the resin formation chip 20, the main field is made into the shape of an abbreviation square on abbreviation monotonous. The configuration of this resin formation chip 20 is a configuration which hardened resin 22 and was formed, and after applying non-hardened resin to the whole surface so that each component 21 may specifically be included, and hardening this, it is the configuration acquired by cutting a marginal part by dicing etc.

[0060] The electrode pads 23 and 24 are formed in a front-face [of the resin 22 on abbreviation monotonous], and rear-face side, respectively. Formation of these electrode pads 23 and 24 forms conductive layers, such as a metal layer used as the ingredient of the electrode pads 23 and 24, and a polycrystalline silicon layer, in the whole surface, and it is formed by carrying out patterning to a necessary electrode configuration with a photolithography technique. These electrode pads 23 and 24 are formed so that it may connect with p electrode and n electrode of a component 21 which are a light emitting device, respectively, and a beer hall etc. is formed in resin 22 when required.

[0061] Although the electrode pads 23 and 24 are formed in the front-face [of the resin formation chip 20], and rear-face side here, respectively, it is also possible to form both electrode pads in one field, for example, in the case of a thin film transistor, since there are the source, the gate, and three electrodes of a drain, an electrode pad may be formed three or more than it. It is for making contact the location of the electrode pads 23 and 24 not lap at all from the bottom at the time of the wiring formation with that final of plate-like gap ******. The

configuration of the electrode pads 23 and 24 is not limited to a square, either, but is good also as other configurations.

[0062] With constituting such a resin formation chip 20, the surroundings of a component 21 are covered by resin 22, and in being able to extend the electrode pads 23 and 24 with a sufficient precision and advancing an imprint at the following second imprint process with an adsorption fixture by flattening, handling becomes easy. Since it is carried out after the second imprint process which final wiring follows so that it may mention later, poor wiring is beforehand prevented by performing wiring using the electrode pads 23 and 24 of comparatively oversized size.

[0063] Next, the structure of the light emitting device as an example of the component which is the method of a two-step expansion imprint of this example, and is used for drawing 9 is shown. (a) of drawing 9 is a component sectional view, and (b) of drawing 9 is a top view. This light emitting device is the light emitting diode of a GaN system, for example, is a component by which crystal growth is carried out on a sapphire substrate. In the light emitting diode of such a GaN system, laser ablation arises by the laser radiation which penetrates a substrate, film peeling arises in the interface between a sapphire substrate and the growth phase of a GaN system in connection with the phenomenon which the nitrogen of a GaN system evaporates, and it has the description as for which isolation is made to an easy thing.

[0064] First, about the structure, the GaN layer 32 of the hexagon-head drill configuration by which selective growth was carried out is formed on the substrate growth phase 31 which consists of a GaN system semi-conductor layer. in addition, the part to which the insulator layer which is not illustrated existed on the substrate growth phase 31, and the GaN layer 32 of a 6 pyramid configuration carried out opening of the insulator layer -- MOCVD -- it is formed of law etc. This GaN layer 32 is a growth phase of the pyramid mold covered by the Sth page (the 1 to 101st page), when the principal plane of the sapphire substrate used at the time of growth is made into C side, and it is the field which made silicon dope. The part of the Sth page toward which this GaN layer 32 inclined functions as a clad of terrorism structure to double. The InGaN layer 33 which is a barrier layer is formed so that the Sth page toward which the GaN layer 32 inclined may be covered, and the GaN layer 34 of a magnesium dope is formed in the outside. The GaN layer 34 of this magnesium dope also functions as a clad.

[0065] The p electrode 35 and the n electrode 36 are formed in such light emitting diode. The p electrode 35 vapor-deposits metallic materials, such as nickel/Pt/Au formed on the GaN layer 34 of a magnesium dope, or nickel(Pd) / Pt/Au, and is formed. In the part which carried out opening of the insulator layer which the above-mentioned does not illustrate, the n electrode 36 vapor-deposits metallic materials, such as Ti/aluminum/Pt/Au, and is formed. In addition, as shown in drawing 9 , when performing n electrode ejection from the rear-face side of the substrate growth phase 31, formation of the n electrode 36 becomes unnecessary at the front-face side of the substrate growth phase 31.

[0066] The light emitting diode of such a GaN system of structure is the component which can also be published blue, it can exfoliate from a sapphire substrate comparatively more easily than especially laser ablation, and alternative exfoliation is realized by irradiating a laser beam alternatively. In addition, as light emitting diode of a GaN system, you may be the structure

where a barrier layer is formed in plate-like or band-like, and may be the thing of the pyramid structure where C side was formed in the upper limit section. Moreover, you may be other nitride system light emitting devices, compound semiconductor elements, etc.

[0067] Next, the concrete technique of the array approach of the light emitting device shown in drawing 6 is explained, referring to from drawing 10 to drawing 16 . An issue component uses the light emitting diode of a GaN system shown in drawing 9 . First, as shown in drawing 10 , on the principal plane of the first substrate 41, two or more light emitting diodes 42 are formed in the shape of a matrix. Magnitude of light emitting diode 42 can be set to about 20 micrometers. An ingredient with the high permeability of the laser wavelength which irradiates light emitting diode 42 like a sapphire substrate as a structural material of the first substrate 41 is used. Although p electrode is formed in light emitting diode 42, final wiring is not yet made, but 42g of slots of separation between components is formed, and each light emitting diode 42 is in the condition of being separable. Formation of 42g of this slot is performed by reactive ion etching. Such first substrate 41 is confronted with the member 43 for maintenance temporarily, as shown in drawing 11 , and an alternative imprint is performed.

[0068] Stratum disjunctum 44 and a glue line 45 turn into two-layer, and are formed in the field which stands face to face against the first substrate 41 of the member 43 for maintenance temporarily. As an example of the member 41 for maintenance, a glass substrate, a quartz-glass substrate, a plastic plate, etc. can be used, and a fluorine coat, silicon resin, water-soluble adhesives (for example, PVA), polyimide, etc. can be used as an example of the stratum disjunctum 44 on an attachment component 41 here temporarily. Moreover, the layer which consists of (ultraviolet-rays UV) hardening mold adhesives, thermosetting adhesive, or thermoplastic adhesive as stratum disjunctum 45 on the member 43 for maintenance temporarily can be used. As an example, UV hardening mold adhesives as a glue line 45 are applied by about 20-micrometer thickness after forming 4 micrometers of polyimide **** as stratum disjunctum 44 temporarily, using a quartz-glass substrate as a member 43 for maintenance.

[0069] The glue line 45 of the member 43 for maintenance is adjusted so that 45s of fields and non-hardened field 45y which were hardened may be intermingled, and alignment is carried out temporarily so that the light emitting diode 42 applied to a selection imprint at non-hardened field 45y may be located. What is necessary is for adjustment in which 45s of fields and non-hardened field 45y which were hardened are intermingled to carry out UV exposure for example, of the UV hardening mold adhesives in 200-micrometer pitch alternatively with an exposure machine, and just to change the place which imprints light emitting diode 42 into the condition of making it having hardened, more than it by un-hardening. After such alignment, the light emitting diode 42 of the location is irradiated from the rear face of the first substrate 41 by laser, and light emitting diode 42 is exfoliated from the first substrate 41 using laser ablation. From decomposing into metaled Ga and nitrogen by the interface with sapphire, the light emitting diode 42 of a GaN system can exfoliate comparatively easily. Excimer laser, higher-harmonic laser, etc. are used as laser to irradiate.

[0070] It dissociates by the interface of a GaN layer and the first substrate 41, and as the light emitting diode 42 caught in selective irradiation thrusts p electrode section of light emitting

diode 42 into non-hardened field 45y of the glue line 45 of the opposite side, it is imprinted by exfoliation using this laser ablation. About the light emitting diode 42 of the field where other laser is not irradiated, since it is 45s of fields which the corresponding part of a glue line 45 hardened and laser is not irradiated, either, it does not imprint temporarily at the member 43 side for maintenance. In addition, although laser radiation only of the one light emitting diode 42 is alternatively carried out in drawing 10 , in the field estranged by n pitch, laser radiation of the light emitting diode 42 shall be carried out similarly. By such alternative imprint, light emitting diode 42 is estranged rather than the time of being arranged on the first substrate 41, and is arranged on the member 43 for maintenance temporarily.

[0071] Light emitting diode 42 is in the condition held temporarily at the glue line 45 of the member 43 for maintenance, the rear face of light emitting diode 42 is on n electrode side (cathode electrode side), and the electrode pad 46 is electrically connected with the rear face of light emitting diode 42 in the case where the electrode pad 46 is formed as shown in drawing 11 since it is removed and washed so that there may be no resin (adhesives) in the rear face of light emitting diode 42.

[0072] As an example of washing of a glue line 45, etching and UV ozone exposure wash the resin for adhesives with the oxygen plasma. And since Ga deposits in the stripped plane when GaN system light emitting diode is exfoliated by laser from the first substrate 41 which consists of a sapphire substrate, it will be required to etch the Ga and it will carry out by the NaOH water solution or the aqua fortis. Then, patterning of the electrode pad 46 is carried out. The electrode pad by the side of the cathode at this time can be used as about 60-micrometer angle. As an electrode pad 46, ingredients, such as transparent electrodes (ITO and ZnO systems etc.) or Ti/aluminum/Pt/Au, are used. Since in the case of a transparent electrode luminescence is not interrupted even if it covers the rear face of light emitting diode greatly, patterning precision is coarse, big electrode formation can be performed, and a patterning process becomes easy.

[0073] After drawing 12 imprints light emitting diode 42 from the member 43 for maintenance to the ** attachment component 47 second temporarily temporarily and forms the beer hall 50 by the side of an anode electrode (p electrode), it forms the anode lateral electrode pad 49, and shows the condition of having carried out the dicing of the glue line 45 which consists of resin. As a result of this dicing, the isolation slot 51 was formed and light emitting diode 42 was classified for every component. The isolation slot 51 consists of two or more parallel lines extended in all directions as a flat-surface pattern in order to separate each matrix-like light emitting diode 42. At the pars basilaris ossis occipitalis of the isolation slot 51, the front face of the second member 47 for momentary maintenance faces.

[0074] Moreover, stratum disjunctum 48 is formed on the second member 47 for momentary maintenance. This stratum disjunctum 48 can be created using for example, a fluorine coat, silicon resin, water-soluble adhesives (for example, PVA), polyimide, etc. The second member 47 for momentary maintenance is the so-called dicing sheet with which UV adhesion material is applied to the plastic plate as an example, and if UV is irradiated, it can use that to which adhesion falls.

[0075] Excimer laser is irradiated from the rear face of the member 47 for maintenance

temporarily [in_which such stratum disjunctum 48 was formed]. Thereby, in the case where polyimide is formed as stratum disjunctum 44, exfoliation occurs by the ablation of polyimide in the interface of polyimide and a quartz substrate, and each light emitting diode 42 is imprinted at the second member 47 side for momentary maintenance.

[0076] As an example of this process, it etches until the front face of a light emitting diode 42 exposes the front face of the second member 47 for momentary maintenance with the oxygen plasma. Formation of a beer hall 50 can use excimer laser, a higher-harmonic YAG laser, and carbon dioxide gas laser first. At this time, a beer hall will open an about 3-7-micrometer diameter. An anode lateral electrode pad is formed by nickel/Pt/Au etc. A dicing process performs processing by the laser which used the above-mentioned laser, when the dicing using the usual blade and slitting with narrow width of face of 20 micrometers or less are need. It depends for the slitting width of face on the magnitude of the light emitting diode 42 covered by the glue line 45 which consists of resin in the pixel of an image display device. As an example, 40 micrometer recessing of **** is performed in excimer laser, and the configuration of a chip is formed.

[0077] Next, light emitting diode 42 exfoliates [second] from the member 47 for maintenance temporarily using a mechanical means. Drawing 13 is drawing having shown the place which takes up the light emitting diode 42 arranged on the second member 47 for momentary maintenance with an adsorber 53. Opening of the adsorption hole 55 at this time is carried out to the pixel pitch of an image display device at the shape of a matrix, and they can adsorb light emitting diode 42 now by package. [many] Opening of the diameter of opening at this time is carried out to the shape of a matrix of 600-micrometer pitch by abbreviation phi100micrometer, and it can adsorb about 300 pieces by package. That to which the member of the adsorption hole 55 at this time carried out hole processing of the metal plates 52, such as a thing produced by nickel electrocasting or SUS, by etching is used, the adsorption chamber 54 is formed in the inner part of the adsorption hole 55 of a metal plate 52, and adsorption of light emitting diode 42 is attained by controlling this adsorption chamber 54 to negative pressure. It is covered by the glue line 45 which consists of resin in this phase, and abbreviation flattening of that top face is carried out, for this reason light emitting diode 42 can advance alternative adsorption by the adsorber 53 easily.

[0078] Drawing 14 is drawing having shown the place which imprints light emitting diode 42 to the second substrate 60. The imprint approach shown in drawing 4 from above-mentioned drawing 1 is applied to this imprint. That is, in case the second substrate 60 is equipped, the glue line 56 is beforehand applied to the second substrate 60, the glue line 56 of the light emitting diode 42 inferior surface of tongue is stiffened, and the second substrate 60 is made to fix and arrange light emitting diode 42. At the time of this wearing, the adsorption chamber 54 of an adsorber 53 will be in the condition that a pressure is high, and the integrated state by adsorption with an adsorber 53 and light emitting diode 42 will be released.

[0079] Here, thermosetting adhesive, thermoplastic adhesive, etc. can constitute a glue line 56, and it contains light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73. There is an ingredient like a calcium carbonate or carbon as light absorption material 56a which this glue line 56 is made to contain.

[0080] The location where light emitting diode 42 is arranged becomes the member 43 for maintenance, and the thing estranged rather than the array on 47 temporarily. The energy which stiffens the resin of a glue line 56 then is supplied from the rear face of the second substrate 60.

[0081] As stated also like the point, from the rear face of the second substrate 60, a laser beam 73 is irradiated and the glue line 56 of the part corresponding to the resin formation chip (light emitting diode 42 and glue line 45) which imprints is heated. Thereby, when a glue line 56 is thermoplastic adhesive, the glue line 56 of the part softens and a resin formation chip fixes on the second substrate 60 by carrying out cooling hardening after that. Similarly, when a glue line 56 is thermosetting adhesive, the glue line 56 of the part by which the laser beam 73 was irradiated hardens, and a resin formation chip fixes on the second substrate 60.

[0082] Direct or the glue line which has light emitting diode 42 indirectly through light emitting diode 42 or the electrode layer 57 can be heated alternatively, without heating the glue line near the light emitting diode which is not a candidate for an imprint by irradiating a laser beam 73 from the rear-face side of the second substrate 60 at this time. Furthermore, by making light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73 contain, the glue line 56 with light emitting diode 42 can be made to be able to absorb a laser beam 73 much more well, and the glue line can be heated much more well. Therefore, a glue line with light emitting diode 42 can be heated alternatively efficiently.

[0083] Moreover, the electrode layer 57 which functions also as a shadow mask is arranged on the second substrate 60, and this electrode layer 57 is heated and you may make it heat a glue line 56 indirectly by irradiating a laser beam 73. The black chromium layer 58 is formed in the field of the side in which those who look at especially, the front face, i.e., image display device concerned, by the side of the screen of the electrode layer 57, are. The rate of energy-absorbing in the black chromium layer 58 is both highly carried out to if the contrast of an image can be raised by doing in this way, and a glue line 56 can harden early by the laser beam 73 irradiated alternatively.

[0084] Drawing 15 is drawing showing the condition of having made the second substrate 60 arranging the light emitting diodes 42, 61, and 62 of three colors of RGB, and having applied the insulating layer 59. The adsorber 53 used by drawing 13 and drawing 14 is used as it is, and if it mounts only by shifting the location mounted on the second substrate 60 in the location of the color, the pitch as a pixel can form the pixel which consists of three color while it has been fixed. As an insulating layer 59, a transparence epoxy adhesive, UV hardening mold adhesives, polyimide, etc. can be used. The light emitting diodes 42, 61, and 62 of three colors do not necessarily need to be the same configurations. Although red light emitting diode 61 is made into the structure where it does not have the layer of the hexagon-head drill GaN and other light emitting diodes 42 and 62 differ from the configuration of those in drawing 13 , in this phase, each light emitting diodes 42, 61, and 62 are covered by the glue line 45 which already consists of resin as a resin formation chip, and the same handling is realized in spite of the difference in component structure.

[0085] Drawing 16 is drawing showing a wiring formation process. It is drawing which formed openings 65, 66, 67, 68, 69, and 70 in the insulating layer 59, and formed the wiring 63, 64, and

71 which connects the electrode layer 57 for wiring of the second substrate 60 with the anode of light emitting diodes 42, 61, and 62, and the electrode pad of a cathode. Since area of the electrode pads 46 and 49 of light emitting diodes 42, 61, and 62 is enlarged, opening, i.e., the beer hall, formed at this time, a beer hall configuration is large and can be formed in a coarse precision compared with the beer hall which also forms the location precision of a beer hall in each light emitting diode directly. The beer hall at this time can form an abbreviation phi20micrometer thing to the electrode pads 46 and 49 of about 60-micrometer angle. Moreover, although it connects with the thing linked to a wiring substrate, the thing linked to an anode electrode, and a cathode electrode, since the depth of a beer hall has three kinds of depth, it is controlled by the pulse number of laser, and it carries out opening of the optimal depth. Then, a protective layer is formed on wiring and the panel of an image display device is completed. At this time, a protective layer can use the same ingredients, such as the insulating layer 59 of drawing 14 , and a transparence epoxy adhesive. Heat hardening is carried out and this protective layer is completely a wrap about wiring. Then, a driver IC will be connected from wiring of a panel edge, and a drive panel will be manufactured.

[0086] Since the array approach of an above-mentioned light emitting device uses the imprint approach of the component of this invention, by making a glue line 56 contain light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73, it can heat efficiently a glue line with light emitting diode 42 alternatively, and can arrange light emitting diode 42 efficiently.

[0087] Furthermore, since a laser beam 73 is absorbed by light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73 and a laser beam 73 does not result in light emitting diode 42 by it, it is avoidable that a laser beam 73 damages light emitting diode 42. Therefore, it can arrange, without damaging light emitting diode 42 by the laser beam 73.

[0088] Moreover, since what is necessary is just to apply a glue line 56 completely by the imprint approach of the component of this invention after making a glue line 56 contain light absorption material 7a which selection is lost, becomes simple and raises the absorption coefficient of the glue line 56 to a laser beam 73 since there is no dependency of the component which is a candidate for an imprint, and the ingredient of a laser beam, light emitting diode 42 can be arranged according to a simple process.

[0089] And the time amount by which a laser beam 73 is irradiated by light emitting diode 42 with efficient heating of a glue line with light emitting diode 42 is short, and light emitting diode 42 can be arranged with a certainly sufficient precision, without exfoliation and a location gap arising in light emitting diodes other than the light emitting diode which is a candidate for an imprint, without affecting the fixing condition of other light emitting diodes, since a glue line with other light emitting diodes is not heated.

[0090] It becomes possible to form the electrode pads 46 and 49 with comparatively large size etc. using spacing between the components which already spread in the array approach of an above-mentioned light emitting device when light emitting diode 42 was made to hold to the member 43 for momentary maintenance in order to use an expansion imprint. Since wiring using the electrode pads 46 and 49 with these big comparison-size is performed, even if it is

the case that the size of final equipment is remarkable and big, as compared with component size, wiring can be formed easily. Moreover, handling becomes easy, in being able to extend the electric pads 46 and 49 to a large field compared with a component and advancing an imprint at the following second imprint process with an adsorption fixture, while being covered with the glue line 45 which the perimeter of a light emitting device hardened and being able to form the electric pads 46 and 49 with a sufficient precision by flattening.
[0091]
[Effect of the Invention] Direct or the glue line which is near the component of the request which is a candidate for an imprint indirectly through a component or wiring can be heated alternatively, without heating the glue line near components other than the component which is a candidate for an imprint by irradiating a laser beam from a substrate rear-face side according to the imprint approach of the component of this invention. Therefore, by making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam, or making it arrange near the glue line, the glue line near the component of the request which is a candidate for an imprint can be made to be able to absorb a laser beam much more well, and the glue line can be heated much more well. Therefore, a glue line with the component of the request which is a candidate for an imprint can be heated alternatively efficiently.
[0092] Furthermore, it can avoid that a laser beam hurts its component used as the candidate for an imprint, without a laser beam resulting in the component which a laser beam is absorbed by light absorption material with the high absorption coefficient of a laser beam, and serves as a candidate for an imprint by it. Therefore, the various classes and wavelength of laser without the ingredient and relation of a component can be selected, without taking into consideration hurting one's component by the laser beam.
[0093] And by choosing a known absorption property [of a laser beam] ingredient as an ingredient of the light absorption material, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of a laser beam as an ingredient of a component can be selected.
[0094] Thus, since what is necessary is just to form a glue line in the whole surface after selection was lost, becoming simple, and making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam or making it arrange near the glue line since the dependency of a laser beam and the ingredient of a component is lost, simplification of a process is possible.
[0095] moreover, since a glue line with the component which is a candidate for an imprint can boil efficiently and can heat by the light-absorption material, the irradiation time of the laser beam to a component is short, and neither exfoliation nor a location gap do not arise for any components other than the component which is a candidate for an imprint, without affecting the fixing condition of components other than the component which is a candidate for an imprint, since the glue line near the component which is a candidate for an imprint is not heated
[0096] Without according to the array approach of the component of this invention, a component hurting by the laser beam, since the imprint approach of the above-mentioned

component is applied, it is efficient, the imprint of a component can be ensured and it is possible to carry out smoothly the expansion imprint which enlarges distance between components.

[0097] Similarly, according to the manufacture approach of the image display device of this invention, it is possible to apply the imprint approach of the above-mentioned component, to be able to estrange efficiently the light emitting device created by performing micro processing, and to be able to rearrange [can make it high, dense condition, i.e., degree of integration] it, therefore to manufacture an image display device with a high precision with sufficient productivity.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] When arranging a light emitting device in the shape of a matrix and finishing setting up to an image display device conventionally, forming a component on a substrate like a liquid crystal display (LCD:Liquid Crystal Display) or a plasma display (PDP:Plasma Display Panel), or arranging the LED package of a simple substance like a light emitting diode display (LED display) is performed. In the conventional LED and the image display device like PDP, about the pitch and its manufacture process of a component or a pixel, since isolation is not made, it is usually performed from the beginning of a manufacture process that each component vacates only the pixel pitch of the image display device, and forms spacing. On the other hand, in the case of a LED display, an LED chip is usually taken out after dicing, it connects with an external electrode by bump connection by wire bond or the flip chip according to an individual, and being package-ized is performed. In this case, it is arranged by the pixel pitch as an image display device in front of package-izing or in the back.
[0003] Since LED (light emitting diode) which is a light emitting device is expensive, it can manufacture the image display device using LED to low cost by manufacturing much LED chips from one wafer. That is, about 300-micrometer thing is conventionally made the LED chip of dozens of micrometer angle for an LED chip size, and if it is mounted and an image display device is manufactured, the price of an image display device can be lowered.
[0004] then, each component -- a degree of integration -- techniques, such as a thin film replica method which form highly, and it is made to move, making a large field estrange each component by imprint etc., and there is a technique which constitutes comparatively big displays, such as an image display device, for example, is indicated by United States patent No.5438241, and the formation approach of the transistor array panel for a display indicated by JP,11-142878,A, are known. In United States patent No.5438241, after indicating the imprint approach by which the component densely formed on the substrate is rearranged at **, getting down and imprinting a component to an elasticity substrate with adhesives, an elasticity substrate is elongated in x directions and the direction of y, acting as the monitor of spacing and the location of each component. And each component on the elongated substrate is imprinted on a necessary display panel. Moreover, with the technique indicated by JP,11-142878,A, the whole imprint of the thin film transistor which constitutes the liquid crystal display section on the first substrate is carried out on the second substrate, and the technique

alternatively imprinted from the second substrate to the third substrate corresponding to a pixel pitch next is indicated.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] Direct or the glue line which is near the component of the request which is a candidate for an imprint indirectly through a component or wiring can be heated alternatively, without heating the glue line near components other than the component which is a candidate for an imprint by irradiating a laser beam from a substrate rear-face side according to the imprint approach of the component of this invention. Therefore, by making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam, or making it arrange near the glue line, the glue line near the component of the request which is a candidate for an imprint can be made to be able to absorb a laser beam much more well, and the glue line can be heated much more well. Therefore, a glue line with the component of the request which is a candidate for an imprint can be heated alternatively efficiently.
[0092] Furthermore, it can avoid that a laser beam hurts its component used as the candidate for an imprint, without a laser beam resulting in the component which a laser beam is absorbed by light absorption material with the high absorption coefficient of a laser beam, and serves as a candidate for an imprint by it. Therefore, the various classes and wavelength of laser without the ingredient and relation of a component can be selected, without taking into consideration hurting one's component by the laser beam.
[0093] And by choosing a known absorption property [of a laser beam] ingredient as an ingredient of the light absorption material, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of a laser beam as an ingredient of a component can be selected.
[0094] Thus, since what is necessary is just to form a glue line in the whole surface after selection was lost, becoming simple, and making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam or making it arrange near the glue line since the dependency of a laser beam and the ingredient of a component is lost, simplification of a process is possible.
[0095]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] When manufacturing an image display device with the above imprint techniques, the component used as the candidate for an imprint needs to be imprinted alternatively and certainly. Moreover, an efficient imprint and an accurate imprint are also required. As an approach of carrying detailed electronic parts, and an electron device and the electronic parts which embedded them further at an insulator like plastics on a mounting substrate, the method of using thermoplastics as adhesives is common. For example, thermoplastics is applied to the need part of a mounting substrate, and electronic parts are placed on it. Then, it heats the whole substrate, adhesives are softened, and it cools after that, and fixes to a substrate. Or as other approaches, thermoplastics is applied all over a substrate, electronic parts are placed on it, and it heats the whole substrate, and subsequently adhesives are softened, it cools and fixes, and the method of removing the adhesives exposed by etching or plasma treatment, and acquiring the same structure is also learned after that.
[0006] However, when such an approach is used, when placing electronic parts, the activity which it places one [at a time] regularly is needed, and a location gap, exfoliation, etc. of other components by complete heating of about [being very complicated] and a substrate become a problem. For example, the method of imprinting from a substrate to a substrate, in arranging the components of an imprinting agency to a substrate altogether by arrangement as it is is possible, and when using thermoplastics, it is possible to expose the whole surface to a RF or a necessary ambient atmosphere, to heat it, to generate adhesive strength stronger than the adhesive strength to the substrate of an imprinting agency, and to imprint to a substrate side.
[0007] However, this is applied, and although it is also possible to imprint components to imprint and components not to imprint alternatively, since it is difficult to heat desired components, it has not resulted in practical use with the existing technique. Furthermore, in the existing complete heating, if thermoplastics is applied to an excessive part, the installation location of components may change with a fluidity at the time of heating. Therefore, it will be necessary to apply resin to the location on which components are generally put beforehand, and the complicatedness of placing one at a time as mentioned above cannot be canceled. Although the method of similarly taking out electronic parts from an imprinting agency once using an adsorption head etc., and placing on a substrate is also considered, when it fixes to a substrate from an adsorption head and complete heating is performed, there is a possibility

that already pasted-up another components may exfoliate.

[0008] Moreover, by the approach of heating completely with laser, when thermoplastics and components do not have the high absorption coefficient of a laser beam, they have the problem that it is not heated by desired extent. Moreover, in the case where heating surfaces are components, there is a problem that thermal resistance is needed for the components itself. And if it heats completely using laser, the need of choosing the wavelength of laser with the rate of light absorption high about either or two or more members of wiring on thermoplastics, components, and a substrate will arise.

[0009] This invention is proposed in view of this conventional actual condition, can imprint certainly the component which serves as a candidate for an imprint among the components on a substrate, and aims at offering the array approach of a component, and the manufacture approach of an image display device further for the purpose of offering the imprint approach of the component which can imprint a component with an efficiently and sufficient precision.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] For the component arranged on the first substrate, the imprint approach of the component of this invention irradiates a laser beam through the second substrate with which the glue line was formed, and heats alternatively said glue line on said second substrate. In the imprint approach of a component of pasting up said component used as the candidate for an imprint on said second substrate, it is characterized by making a glue line contain the light absorption material which raises the absorption coefficient of said glue line to a laser beam, or making it arrange near the glue line.
[0011] Direct or the glue line which has the component of the request which is a candidate for an imprint indirectly through a component or wiring can be heated alternatively, without heating the glue line near [other than the component which is a candidate for an imprint by irradiating a laser beam from a substrate rear-face side] the component according to this invention. Furthermore, by making a glue line contain the light absorption material which raises the absorption coefficient of the glue line to a laser beam, or making it arrange near the glue line, a glue line with the component of the request which is a candidate for an imprint can be made to be able to absorb a laser beam much more well, and the glue line can be heated much more well. Therefore, a glue line with the component of the request which is a candidate for an imprint can be heated alternatively efficiently.
[0012] Furthermore, since it does not result in the component from which a laser beam is absorbed by light absorption material with the high absorption coefficient of a laser beam, and a laser beam serves as a candidate for an imprint by it, a laser beam can avoid hurting one's component used as the candidate for an imprint. Therefore, the various classes and wavelength of laser without the ingredient and relation of a component can be selected, without taking into consideration that a laser beam hurts its component.
[0013] Moreover, by choosing a known absorption property [of a laser beam] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of a laser beam as an ingredient of a component can be selected.
[0014] In the array approach of the component which carries out the rearrangement of two or

more components with which the array approach of the component of this invention was arranged on the first substrate on the second substrate The first imprint process which said component is imprinted [process] and makes this component hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said component was arranged on said first substrate, The process separated for every component after hardening said component held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said component used as the candidate for an imprint which irradiated the laser beam through said second substrate at said component, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0015] In the array approach of the above-mentioned component, since the glue line near the component which serves as a candidate for an imprint using the above-mentioned imprint approach can be heated efficiently and certainly, an imprint is ensured [efficiently and] and the expansion imprint which enlarges distance between components can be carried out smoothly.

[0016] In the manufacture approach of an image display device that the manufacture approach of the image display device of this invention has arranged the light emitting device in the shape of a matrix The first imprint process which said light emitting device is imprinted [process] and makes this light emitting device hold to the member for maintenance temporarily so that it may be in the condition of having estranged from the condition that said light emitting device was arranged on said first substrate, The process separated for every light emitting device after hardening said light emitting device held temporarily [said] at the member for maintenance by resin, The process which makes formation or said light absorption material arrange the glue line containing the light absorption material which raises the absorption coefficient of a laser beam near the glue line on said second substrate, It is characterized by having the second imprint process which pastes said second substrate and imprints said light emitting device used as the candidate for an imprint which irradiated the laser beam through said second substrate at said light emitting device, heated alternatively said glue line on said second substrate, was held temporarily [said] at the substrate for maintenance, and was hardened by resin.

[0017] According to the manufacture approach of the above-mentioned image display device, by the above-mentioned imprint approach and the array approach, a light emitting device is arranged in the shape of a matrix, and an image display part is constituted. Therefore, since the glue line near the component used as the candidate for an imprint can be heated efficiently and certainly, an imprint can be ensured [efficiently and], it is made high, dense condition, i.e., degree of integration, and the light emitting device created by performing micro processing can be estranged efficiently, and can be rearranged, and productivity is improved sharply.

[0018]
[Embodiment of the Invention] Hereafter, the imprint approach of the component which applied this invention, the array approach, and the manufacture approach of an image display device are explained to a detail, referring to a drawing. In addition, the case where the light absorption material which raises the absorption coefficient of the glue line to a laser beam to a glue line in this operation gestalt is made to contain is explained.
[0019] Moreover, there are particle-like ingredients, such as a metal membrane which consists of chromium which is a thin film, aluminum, etc. as an ingredient of the light absorption material which raises the absorption coefficient of the glue line to the laser beam which a glue line is made to contain or is made to arrange near the glue line or carbon black, and a calcium carbonate. When the light absorption material which raises the absorption coefficient of the glue line to a laser beam is a metaled thin film, you may form in an adhesion side of a component, a front face of a glue line, etc. used as the candidate for an imprint, and a glue line may be made to contain in the case of a particle-like ingredient, or you may make it form in it on the surface of a component.
[0020] First, the imprint approach of a basic component is explained. In order to imprint a component by this invention, as shown in drawing 1 (a), a glue line 2 is formed on the substrate 1 which becomes an imprinting agency, and array formation of two or more components 3 is carried out on this.
[0021] Here, it becomes possible by using adhesive resin with adhesion small for example comparatively etc. for the above-mentioned glue line 2 to imprint to other substrates simply.
[0022] Moreover, if it can apply to the component of arbitration and illustrates as a component 3, a light emitting device, liquid crystal controlling element, photoelectrical exchange component, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component etc. can be mentioned.
[0023] Subsequently, as shown in drawing 1 (b), the substrate 4 for maintenance (the first substrate) is stuck by pressure temporarily which counters with this substrate 1 and becomes mediation of an imprint, and this component 3 required on the substrate 4 for maintenance temporarily is copied alternatively.
[0024] On the substrate 4 for maintenance, the glue line 5 is alternatively formed corresponding to component 3a used as the candidate for an imprint at the time of top Norikazu, and adhesion of this glue line 5 is made larger than the adhesion of the glue line 2 on a substrate 1. Thus, by making adhesion of a glue line 5 larger than the adhesion of the glue line 2 on a substrate 1, component 3a can be imprinted easily. Drawing 1 (c) shows the condition of removing the substrate 4 for maintenance from the substrate 1 temporarily, and component 3a is imprinted on the glue line 5 formed alternatively.
[0025] Next, as shown in drawing 1 (d), the substrate 4 for maintenance is made to counter with the imprint substrate (the second substrate) 6 temporarily which copied this component 3a, it is stuck by pressure, and component 3a is shifted to the imprint substrate 6 side. The glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue line to a laser beam is formed in the whole surface, and 8 near the component 3a is already

being fixed to the front face of the above-mentioned imprint substrate 6. The glue line 7 containing 7a which raises the absorption coefficient of the glue line to a laser beam is formed by applying for example, thermoplastic adhesion resin. Moreover, since the above-mentioned imprint substrate 6 needs to irradiate a laser beam from the rear-face side of this imprint substrate 6 at the time of the imprint of component 3a, it is desirable to have light transmission nature.

[0026] After laying the substrate 4 for maintenance on top of the above-mentioned imprint substrate 6 on the occasion of an imprint temporarily, laser beam L is irradiated from the rear-face side of the imprint substrate 6, the above-mentioned glue line 7 is hardened alternatively, and component 3a is fixed to a glue line 7 by carrying out cooling hardening after that.

[0027] For example, as shown in drawing 2 , laser beam L is irradiated from the rear-face side of the imprint substrate 6, and the above-mentioned glue line 7 of the part which component 3a used as the candidate for an imprint touches is heated alternatively. Then, although the heating field H of a glue line 7 which consists of thermoplastic adhesion resin hardens and adhesive strength is demonstrated to component 3a, since light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L is contained, a glue line with component 3a can absorb laser beam L better, and can heat the glue line better. Therefore, a glue line with component 3a of the request which is a candidate for an imprint can be heated alternatively efficiently, and a glue line with component 3a can be heated alternatively efficiently.

[0028] Moreover, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and laser beam L resulting in component 3a by it.

[0029] Then, if cooling hardening of a stop and the above-mentioned heating field H is carried out for the exposure of laser beam L, component 3a is fixed to the imprint substrate 6 by the glue line 7. Since light absorption material 7a which raises the rate of light absorption of the glue line 7 to laser beam L to a glue line 7 contains at this time, the glue line which makes that light absorption material 7a absorb laser beam L, and has component 3a can be heated alternatively efficiently. And the time amount by which laser beam L is irradiated by component 3a with efficient heating of a glue line with component 3a is short, and neither exfoliation nor a location gap arises for other components 8, without affecting the fixing condition of other components 8, since a glue line with other components 8 is not heated.

[0030] Although heating of the glue line 7 containing light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L was performed to the glue line 7 by irradiating direct laser beam L in the above-mentioned example When it is difficult to heat a glue line 7 directly by laser beam L, as shown in drawing 3 , it is also possible to heat a glue line 7 indirectly by irradiating laser beam L which penetrated the glue line 7 at component 3a used as the candidate for an imprint, and heating this.

[0031] In such a case, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a by it by making a glue line 7 contain the light absorption material which raises the absorption coefficient of the glue line to

a laser beam like light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, or making it arrange near the glue line 7.
[0032] Laser beam L is irradiated at component 3a used as the candidate for an imprint, and if the part H which touches the above-mentioned glue line 7 is heated, the heat will get across to a glue line 7, and will soften this. If the rest carries out cooling hardening of this, component 3a is fixed to the imprint substrate 6 by the above-mentioned glue line 7.
[0033] Or it is [0034], although it is also possible to heat this by laser radiation and to heat a glue line 7 indirectly when wiring is formed on the imprint substrate 6. Also in such a case, it can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of the laser beam L, and laser beam L resulting in component 3a or wiring by it like ****.
[0035] A circuit pattern 9 is formed on the imprint substrate 6, and drawing 4 shows the example which imprints component 3a on this. Usually, corresponding to component 3a, the circuit pattern 9 for connecting component 3a and a circuit concerned is formed. A circuit pattern 9 consists of metals, such as copper and aluminum, and can be easily heated by laser beam L.
[0036] Then, as shown in drawing 4 , laser beam L is irradiated at the circuit pattern 9 prepared corresponding to component 3a, and the field H corresponding to component 3a is overheated. Then, the heat gets across to a glue line 7, and softens this. The rest is the same, and if cooling hardening of this is carried out, component 3a is fixed to the imprint substrate 6 by the glue line 7.
[0037] In addition, heating shown in above-mentioned drawing 2 thru/or drawing 4 may be performed independently, respectively, or a glue line 7 heats and you may make it these compound and soften finally by the exposure of laser beam L.
[0038] After fixing component 3a to the imprint substrate 6 by the glue line 7 through heating softening by the above-mentioned laser beam exposure, and hardening by cooling, the substrate 4 for momentary maintenance is exfoliated.
[0039] Although component 3a used as the candidate for an imprint is imprinted on the imprint substrate 6 by this, a glue line 7 is formed in the whole surface in this condition.
[0040] Then, it etches, as shown in drawing 1 (e), and the excessive part of a glue line 7 is removed, and a selection imprint process is completed. Thereby, component 3a as shown in drawing 1 (f) can obtain the imprint substrate 6 by which the selection imprint was carried out between components 8.
[0041] As mentioned above, it becomes possible to imprint component 3a alternatively, without these-adjoining and effect attaining to the fixing condition of the adhesion component 8, in order not to tell heat even to the glue line 7 which has fixed the component 8 which became possible [heating the very narrow part of a glue line 7 by using laser beam L for a short time], and was already pasted up adjacently.
[0042] Thus, adhesion near the component 3a can be made to absorb laser beam L much more well by making a glue line 7 contain the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L like light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L. Therefore, the glue line can be heated

much more well, and a glue line with component 3a can be heated alternatively efficiently.
[0043] Furthermore, it can avoid that laser beam L damages component 3a, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a by it. The various classes and wavelength of laser without the ingredient and relation of component 3a can be selected without taking into consideration that the light absorption material with the high absorption coefficient of this laser beam L feels a pain [a / component 3] for laser beam L resulting in component 3a by laser beam L since it protects and laser beam L does not result in component 3a.
[0044] Moreover, by choosing a known absorption property [of laser beam L] ingredient as an ingredient of the light absorption material which raises the absorption coefficient of a glue line 7 to laser beam L, the calorific value at the time of heating can be expected, and the ingredient which does not have the absorption property and relation of laser beam L as an ingredient of component 3a can be selected.
[0045] In addition, in the above explanation, although thermoplastic adhesion resin was made into the example and explained as an ingredient which constitutes a glue line 7, the alternative imprint of a component is possible also for thermosetting adhesion resin by the same technique. In the case of thermosetting adhesion resin, the part heated by the exposure of laser beam L heat-hardens, and a component is fixed in it.
[0046] Moreover, drawing 5 is the case where the glue line 7 which is made to arrange in a glue line 7 side front face light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L, and has component 7a which is a candidate for an imprint is heated. It can avoid that laser beam L damages component 3a and wiring, without laser beam L's being absorbed by light absorption material with the high absorption coefficient of laser beam L, and laser beam L resulting in component 3a or wiring by it like the case where light absorption material 7a which raises the absorption coefficient of the glue line 7 to laser beam L to a glue line 7 also in this case is made to contain.
[0047] If the above-mentioned imprint approach is applied to the component imprint in the image display device of an active matrix etc., it is very useful. It is necessary to adjoin Si transistor which is a driver element and to arrange the light emitting device of R, G, and B in the image display device of an active matrix. Although it is necessary to imprint the light emitting device of these R, G, and B one by one in the location where Si transistor is near, Si transistor will lead to breakage of an internal circuitry, if heat conduction is very good and heat is added. Here, by using the above-mentioned imprint approach, it can avoid that heat gets across to Si transistor, and can cancel above-mentioned un-arranging. For example, when each light emitting device is the small area the magnitude of the above-mentioned Si transistor is 560micrometerx160micrometerx35micrometer, and it is [area] about 5-10 micrometers per side, uses epoxy system thermosetting resin for a glue line and irradiates YAG2 double laser (wavelength of 532nm), heating by laser radiation is 4n second, and cooling is about 10n second. If the heating time by laser radiation is less than [10n second], the effect of heat will not attain to adjoining Si transistor.
[0048] Next, the array approach of the component by the two-step expansion replica method and the manufacture approach of an image display device are explained as an application of

the above-mentioned imprint approach. Two steps of expansion imprints which imprint to the member for maintenance temporarily so that it may be in the condition estranged the component which the array approach of the component of this example and the manufacture approach of an image display device had a high degree of integration, and was created on the first substrate rather than the condition that the component was arranged on the first substrate, estrange said component subsequently to the member for maintenance held temporarily to be carried out, and imprint it on the second substrate perform. In addition, although the imprint is made into two steps with this operation gestalt, an imprint can also be made into three steps or the multistage story beyond it according to whenever [expansion / which estranges and arranges a component].

[0049] Drawing 6 is drawing showing the fundamental process of a two-step expansion replica method, respectively. First, a component 12 like a light emitting device is densely formed on the first substrate 10 shown in (a) of drawing 6 . By forming a component densely, the number of the components generated by per each substrate can be made [many], and product cost can be lowered. Although for example, a semi-conductor wafer, a glass substrate, a quartz-glass substrate, a sapphire substrate, a plastic plate, etc. are substrates in which component formation is possible variously, the first substrate 10 may form each component 12 directly on the first substrate 10, and may arrange what was formed on other substrates.

[0050] Next, as shown in (b) of drawing 6 , each component 12 is imprinted from the first substrate 10 by the member 11 for maintenance temporarily which is shown by the drawing destructive line, and each component 12 is held on the member 11 for maintenance temporarily [this]. The component 12 which adjoins here is estranged and is allotted in the shape of a matrix like illustration. That is, a component 12 is imprinted so that between components may be extended also in the x directions, respectively, but it imprints so that between components may be extended also in the direction perpendicular to x directions of y, respectively. Especially the distance estranged at this time is not limited, but can be made into the distance which took into consideration resin section formation at a consecutive process, and formation of an electrode pad as an example. When it imprints from the first substrate 10 on the member 11 for maintenance temporarily, all the components on the first substrate 10 can be estranged and imprinted. In this case, the size of the member 11 for maintenance should just be more than the size that multiplied by the distance estranged in the number of the components 12 allotted in the shape of a matrix (x directions and the direction of y respectively) temporarily. Moreover, some components on the first substrate 10 are able to estrange and imprint on the member 11 for maintenance temporarily.

[0051] As shown in (c) of drawing 6 after such a first imprint process, since the component 12 which exists on the member 11 for maintenance temporarily is estranged, covering of the resin of the circumference of a component and formation of an electrode pad are performed every component 12. An electrode pad is made easy to form and covering of the resin of the circumference of a component is formed for making easy the handling by the following second imprint process etc. Since formation of an electrode pad is performed after the second imprint process which final wiring follows so that it may mention later, it is formed in comparatively oversized size so that poor wiring may not arise in that case. In addition, the electrode pad is

not illustrated to (c) of drawing 1 . The resin formation chip 14 is formed because resin 13 covers the surroundings of each component 12. On a flat surface, although a component 12 is located in the center of abbreviation of the resin formation chip 14, it may exist in the location which inclined toward the one side and angle side.

[0052] Next, as shown in (d) of drawing 6 , the second imprint process is performed. At this second imprint process, it imprints on the second substrate 15 so that the component 12 allotted in the shape of a matrix on the member 11 for maintenance temporarily may estrange further the whole resin formation chip 14.

[0053] Although the imprint approach shown in above-mentioned drawing 1 is applied to this second imprint process, this is explained in full detail a back forge fire.

[0054] Also in the second imprint process, the adjoining component 12 is estranged every resin formation chip 14, and is allotted in the shape of a matrix like illustration. That is, a component 12 is imprinted so that between components may be extended also in the x directions, respectively, but it imprints so that between components may be extended also in the direction perpendicular to x directions of y, respectively. Supposing the location of the component arranged by the second imprint process is a location corresponding to the pixel of final products, such as an image display device, the abbreviation integral multiple of the pitch between the original components 12 will serve as a pitch of the component 12 arranged by the second imprint process. When the dilation ratio of the estranged pitch in the member 11 for maintenance is set to n from the first substrate 10 here temporarily and the dilation ratio of the estranged pitch in the second substrate 15 is set to m from the member 11 for maintenance temporarily, the value E of an abbreviation integral multiple is E=n (expressed with m.). dilation ratios n and m -- respectively -- an integer -- you may be -- an integer -- not but -- ** -- E becomes an integer -- combining (it being m= 5 at n= 2.4) -- it is -- ****ing .

[0055] Wiring is given to each component 12 estranged every resin formation chip 14 on the second substrate 15. Wiring while obstructing a faulty connection as much as possible using the electrode pad formed previously at this time is made. As for this wiring, in the case of light emitting devices, such as light emitting diode, in the case of a liquid crystal controlling element, a component 12 includes a selection-signal line, an electrical-potential-difference line, wiring of an orientation electrode layer etc., etc. including wiring to p electrode and n electrode.

[0056] In the two-step expansion replica method shown in drawing 6 , although an electrode pad, resin hammer hardening, etc. can be performed using the tooth space estranged after the first imprint and wiring is given after the second imprint, wiring while obstructing a faulty connection as much as possible using the electrode pad formed previously is made. Therefore, the yield of an image display device can be raised. Moreover, in the two-step expansion replica method of this operation gestalt, the processes which estrange the distance between components are two processes, it is performing the expansion imprint of two or more processes which estrange the distance between such components, and the count of an imprint will become fewer in practice. Namely, if the dilation ratio of the estranged pitch in the member 11 for maintenance is set to 2 (n= 2) in part from the first substrate 10 here and the dilation ratio of the estranged pitch in the second substrate 15 is set to 2 (m= 2) from the

members 11 and 11a for maintenance for example, temporarily By the time of imprinting in the range temporarily expanded by the imprint once, the last dilation ratio is 2 (although the need of performing 16 imprints of the square, i.e., the alignment of the first substrate, 16 times arises in 4 times 2). The count of alignment can be managed only with a total of 8 times added simply [the square of the dilation ratio 2 in 4 times and the second imprint process of the square of the dilation ratio 2 in the first imprint process] 4 times with the two-step expansion replica method of this operation gestalt. That is, only 2nm time can surely reduce the count of an imprint from it being 2(n+m) =n2+2 nm+m2, when meaning the same imprint scale factor. Therefore, a production process also serves as saving of time amount or cost by the count, especially it becomes useful when a dilation ratio is large.

[0057] In addition, in the two-step expansion replica method shown in drawing 6 , although the component 12 is used as the light emitting device, you may be the component which was not limited to this but was chosen from the other components, for example, liquid crystal controlling element, optoelectric-transducer, piezoelectric-device, thin film transistor component, thin-film diode component, resistance element, switching element, minute magnetic cell, and microoptics component or its part, such combination, etc.

[0058] In the above-mentioned second imprint process, although it is dealt with as a resin formation chip and the second substrate imprints from on the member for maintenance temporarily, this resin formation chip is explained with reference to drawing 7 and drawing 8 . The resin formation chip 20 is a briquette by resin 22 about the surroundings of the component 21 estranged and arranged, and when imprinting a component 21 from the member for maintenance to the second substrate temporarily, it can use such a resin formation chip 20.

[0059] As for the resin formation chip 20, the main field is made into the shape of an abbreviation square on abbreviation monotonous. The configuration of this resin formation chip 20 is a configuration which hardened resin 22 and was formed, and after applying non-hardened resin to the whole surface so that each component 21 may specifically be included, and hardening this, it is the configuration acquired by cutting a marginal part by dicing etc.

[0060] The electrode pads 23 and 24 are formed in a front-face [of the resin 22 on abbreviation monotonous], and rear-face side, respectively. Formation of these electrode pads 23 and 24 forms conductive layers, such as a metal layer used as the ingredient of the electrode pads 23 and 24, and a polycrystalline silicon layer, in the whole surface, and it is formed by carrying out patterning to a necessary electrode configuration with a photolithography technique. These electrode pads 23 and 24 are formed so that it may connect with p electrode and n electrode of a component 21 which are a light emitting device, respectively, and a beer hall etc. is formed in resin 22 when required.

[0061] Although the electrode pads 23 and 24 are formed in the front-face [of the resin formation chip 20], and rear-face side here, respectively, it is also possible to form both electrode pads in one field, for example, in the case of a thin film transistor, since there are the source, the gate, and three electrodes of a drain, an electrode pad may be formed three or more than it. It is for making contact the location of the electrode pads 23 and 24 not lap at all from the bottom at the time of the wiring formation with that final of plate-like gap ******. The configuration of the electrode pads 23 and 24 is not limited to a square, either, but is good also

as other configurations.

[0062] With constituting such a resin formation chip 20, the surroundings of a component 21 are covered by resin 22, and in being able to extend the electrode pads 23 and 24 with a sufficient precision and advancing an imprint at the following second imprint process with an adsorption fixture by flattening, handling becomes easy. Since it is carried out after the second imprint process which final wiring follows so that it may mention later, poor wiring is beforehand prevented by performing wiring using the electrode pads 23 and 24 of comparatively oversized size.

[0063] Next, the structure of the light emitting device as an example of the component which is the method of a two-step expansion imprint of this example, and is used for drawing 9 is shown. (a) of drawing 9 is a component sectional view, and (b) of drawing 9 is a top view. This light emitting device is the light emitting diode of a GaN system, for example, is a component by which crystal growth is carried out on a sapphire substrate. In the light emitting diode of such a GaN system, laser ablation arises by the laser radiation which penetrates a substrate, film peeling arises in the interface between a sapphire substrate and the growth phase of a GaN system in connection with the phenomenon which the nitrogen of a GaN system evaporates, and it has the description as for which isolation is made to an easy thing.

[0064] First, about the structure, the GaN layer 32 of the hexagon-head drill configuration by which selective growth was carried out is formed on the substrate growth phase 31 which consists of a GaN system semi-conductor layer. in addition, the part to which the insulator layer which is not illustrated existed on the substrate growth phase 31, and the GaN layer 32 of a 6 pyramid configuration carried out opening of the insulator layer -- MOCVD -- it is formed of law etc. This GaN layer 32 is a growth phase of the pyramid mold covered by the Sth page (the 1 to 101st page), when the principal plane of the sapphire substrate used at the time of growth is made into C side, and it is the field which made silicon dope. The part of the Sth page toward which this GaN layer 32 inclined functions as a clad of terrorism structure to double. The InGaN layer 33 which is a barrier layer is formed so that the Sth page toward which the GaN layer 32 inclined may be covered, and the GaN layer 34 of a magnesium dope is formed in the outside. The GaN layer 34 of this magnesium dope also functions as a clad.

[0065] The p electrode 35 and the n electrode 36 are formed in such light emitting diode. The p electrode 35 vapor-deposits metallic materials, such as nickel/Pt/Au formed on the GaN layer 34 of a magnesium dope, or nickel(Pd) / Pt/Au, and is formed. In the part which carried out opening of the insulator layer which the above-mentioned does not illustrate, the n electrode 36 vapor-deposits metallic materials, such as Ti/aluminum/Pt/Au, and is formed. In addition, as shown in drawing 9 , when performing n electrode ejection from the rear-face side of the substrate growth phase 31, formation of the n electrode 36 becomes unnecessary at the front-face side of the substrate growth phase 31.

[0066] The light emitting diode of such a GaN system of structure is the component which can also be published blue, it can exfoliate from a sapphire substrate comparatively more easily than especially laser ablation, and alternative exfoliation is realized by irradiating a laser beam alternatively. In addition, as light emitting diode of a GaN system, you may be the structure where a barrier layer is formed in plate-like or band-like, and may be the thing of the pyramid

structure where C side was formed in the upper limit section. Moreover, you may be other nitride system light emitting devices, compound semiconductor elements, etc.
[0067] Next, the concrete technique of the array approach of the light emitting device shown in drawing 6 is explained, referring to from drawing 10 to drawing 16 . An issue component uses the light emitting diode of a GaN system shown in drawing 9 . First, as shown in drawing 10 , on the principal plane of the first substrate 41, two or more light emitting diodes 42 are formed in the shape of a matrix. Magnitude of light emitting diode 42 can be set to about 20 micrometers. An ingredient with the high permeability of the laser wavelength which irradiates light emitting diode 42 like a sapphire substrate as a structural material of the first substrate 41 is used. Although p electrode is formed in light emitting diode 42, final wiring is not yet made, but 42g of slots of separation between components is formed, and each light emitting diode 42 is in the condition of being separable. Formation of 42g of this slot is performed by reactive ion etching. Such first substrate 41 is confronted with the member 43 for maintenance temporarily, as shown in drawing 11 , and an alternative imprint is performed.
[0068] Stratum disjunctum 44 and a glue line 45 turn into two-layer, and are formed in the field which stands face to face against the first substrate 41 of the member 43 for maintenance temporarily. As an example of the member 41 for maintenance, a glass substrate, a quartz-glass substrate, a plastic plate, etc. can be used, and a fluorine coat, silicon resin, water-soluble adhesives (for example, PVA), polyimide, etc. can be used as an example of the stratum disjunctum 44 on an attachment component 41 here temporarily. Moreover, the layer which consists of (ultraviolet-rays UV) hardening mold adhesives, thermosetting adhesive, or thermoplastic adhesive as stratum disjunctum 45 on the member 43 for maintenance temporarily can be used. As an example, UV hardening mold adhesives as a glue line 45 are applied by about 20-micrometer thickness after forming 4 micrometers of polyimide **** as stratum disjunctum 44 temporarily, using a quartz-glass substrate as a member 43 for maintenance.
[0069] The glue line 45 of the member 43 for maintenance is adjusted so that 45s of fields and non-hardened field 45y which were hardened may be intermingled, and alignment is carried out temporarily so that the light emitting diode 42 applied to a selection imprint at non-hardened field 45y may be located. What is necessary is for adjustment in which 45s of fields and non-hardened field 45y which were hardened are intermingled to carry out UV exposure for example, of the UV hardening mold adhesives in 200-micrometer pitch alternatively with an exposure machine, and just to change the place which imprints light emitting diode 42 into the condition of making it having hardened, more than it by un-hardening. After such alignment, the light emitting diode 42 of the location is irradiated from the rear face of the first substrate 41 by laser, and light emitting diode 42 is exfoliated from the first substrate 41 using laser ablation. From decomposing into metaled Ga and nitrogen by the interface with sapphire, the light emitting diode 42 of a GaN system can exfoliate comparatively easily. Excimer laser, higher-harmonic laser, etc. are used as laser to irradiate.
[0070] It dissociates by the interface of a GaN layer and the first substrate 41, and as the light emitting diode 42 caught in selective irradiation thrusts p electrode section of light emitting diode 42 into non-hardened field 45y of the glue line 45 of the opposite side, it is imprinted by

exfoliation using this laser ablation. About the light emitting diode 42 of the field where other laser is not irradiated, since it is 45s of fields which the corresponding part of a glue line 45 hardened and laser is not irradiated, either, it does not imprint temporarily at the member 43 side for maintenance. In addition, although laser radiation only of the one light emitting diode 42 is alternatively carried out in drawing 10 , in the field estranged by n pitch, laser radiation of the light emitting diode 42 shall be carried out similarly. By such alternative imprint, light emitting diode 42 is estranged rather than the time of being arranged on the first substrate 41, and is arranged on the member 43 for maintenance temporarily.

[0071] Light emitting diode 42 is in the condition held temporarily at the glue line 45 of the member 43 for maintenance, the rear face of light emitting diode 42 is on n electrode side (cathode electrode side), and the electrode pad 46 is electrically connected with the rear face of light emitting diode 42 in the case where the electrode pad 46 is formed as shown in drawing 11 since it is removed and washed so that there may be no resin (adhesives) in the rear face of light emitting diode 42.

[0072] As an example of washing of a glue line 45, etching and UV ozone exposure wash the resin for adhesives with the oxygen plasma. And since Ga deposits in the stripped plane when GaN system light emitting diode is exfoliated by laser from the first substrate 41 which consists of a sapphire substrate, it will be required to etch the Ga and it will carry out by the NaOH water solution or the aqua fortis. Then, patterning of the electrode pad 46 is carried out. The electrode pad by the side of the cathode at this time can be used as about 60-micrometer angle. As an electrode pad 46, ingredients, such as transparent electrodes (ITO and ZnO systems etc.) or Ti/aluminum/Pt/Au, are used. Since in the case of a transparent electrode luminescence is not interrupted even if it covers the rear face of light emitting diode greatly, patterning precision is coarse, big electrode formation can be performed, and a patterning process becomes easy.

[0073] After drawing 12 imprints light emitting diode 42 from the member 43 for maintenance to the ** attachment component 47 second temporarily temporarily and forms the beer hall 50 by the side of an anode electrode (p electrode), it forms the anode lateral electrode pad 49, and shows the condition of having carried out the dicing of the glue line 45 which consists of resin. As a result of this dicing, the isolation slot 51 was formed and light emitting diode 42 was classified for every component. The isolation slot 51 consists of two or more parallel lines extended in all directions as a flat-surface pattern in order to separate each matrix-like light emitting diode 42. At the pars basilaris ossis occipitalis of the isolation slot 51, the front face of the second member 47 for momentary maintenance faces.

[0074] Moreover, stratum disjunctum 48 is formed on the second member 47 for momentary maintenance. This stratum disjunctum 48 can be created using for example, a fluorine coat, silicon resin, water-soluble adhesives (for example, PVA), polyimide, etc. The second member 47 for momentary maintenance is the so-called dicing sheet with which UV adhesion material is applied to the plastic plate as an example, and if UV is irradiated, it can use that to which adhesion falls.

[0075] Excimer laser is irradiated from the rear face of the member 47 for maintenance temporarily [in_which such stratum disjunctum 48 was formed]. Thereby, in the case where

polyimide is formed as stratum disjunctum 44, exfoliation occurs by the ablation of polyimide in the interface of polyimide and a quartz substrate, and each light emitting diode 42 is imprinted at the second member 47 side for momentary maintenance.

[0076] As an example of this process, it etches until the front face of a light emitting diode 42 exposes the front face of the second member 47 for momentary maintenance with the oxygen plasma. Formation of a beer hall 50 can use excimer laser, a higher-harmonic YAG laser, and carbon dioxide gas laser first. At this time, a beer hall will open an about 3-7-micrometer diameter. An anode lateral electrode pad is formed by nickel/Pt/Au etc. A dicing process performs processing by the laser which used the above-mentioned laser, when the dicing using the usual blade and slitting with narrow width of face of 20 micrometers or less are need. It depends for the slitting width of face on the magnitude of the light emitting diode 42 covered by the glue line 45 which consists of resin in the pixel of an image display device. As an example, 40 micrometer recessing of **** is performed in excimer laser, and the configuration of a chip is formed.

[0077] Next, light emitting diode 42 exfoliates [second] from the member 47 for maintenance temporarily using a mechanical means. Drawing 13 is drawing having shown the place which takes up the light emitting diode 42 arranged on the second member 47 for momentary maintenance with an adsorber 53. Opening of the adsorption hole 55 at this time is carried out to the pixel pitch of an image display device at the shape of a matrix, and they can adsorb light emitting diode 42 now by package. [many] Opening of the diameter of opening at this time is carried out to the shape of a matrix of 600-micrometer pitch by abbreviation phi100micrometer, and it can adsorb about 300 pieces by package. That to which the member of the adsorption hole 55 at this time carried out hole processing of the metal plates 52, such as a thing produced by nickel electrocasting or SUS, by etching is used, the adsorption chamber 54 is formed in the inner part of the adsorption hole 55 of a metal plate 52, and adsorption of light emitting diode 42 is attained by controlling this adsorption chamber 54 to negative pressure. It is covered by the glue line 45 which consists of resin in this phase, and abbreviation flattening of that top face is carried out, for this reason light emitting diode 42 can advance alternative adsorption by the adsorber 53 easily.

[0078] Drawing 14 is drawing having shown the place which imprints light emitting diode 42 to the second substrate 60. The imprint approach shown in drawing 4 from above-mentioned drawing 1 is applied to this imprint. That is, in case the second substrate 60 is equipped, the glue line 56 is beforehand applied to the second substrate 60, the glue line 56 of the light emitting diode 42 inferior surface of tongue is stiffened, and the second substrate 60 is made to fix and arrange light emitting diode 42. At the time of this wearing, the adsorption chamber 54 of an adsorber 53 will be in the condition that a pressure is high, and the integrated state by adsorption with an adsorber 53 and light emitting diode 42 will be released.

[0079] Here, thermosetting adhesive, thermoplastic adhesive, etc. can constitute a glue line 56, and it contains light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73. There is an ingredient like a calcium carbonate or carbon as light absorption material 56a which this glue line 56 is made to contain.

[0080] The location where light emitting diode 42 is arranged becomes the member 43 for

maintenance, and the thing estranged rather than the array on 47 temporarily. The energy which stiffens the resin of a glue line 56 then is supplied from the rear face of the second substrate 60.

[0081] As stated also like the point, from the rear face of the second substrate 60, a laser beam 73 is irradiated and the glue line 56 of the part corresponding to the resin formation chip (light emitting diode 42 and glue line 45) which imprints is heated. Thereby, when a glue line 56 is thermoplastic adhesive, the glue line 56 of the part softens and a resin formation chip fixes on the second substrate 60 by carrying out cooling hardening after that. Similarly, when a glue line 56 is thermosetting adhesive, the glue line 56 of the part by which the laser beam 73 was irradiated hardens, and a resin formation chip fixes on the second substrate 60.

[0082] Direct or the glue line which has light emitting diode 42 indirectly through light emitting diode 42 or the electrode layer 57 can be heated alternatively, without heating the glue line near the light emitting diode which is not a candidate for an imprint by irradiating a laser beam 73 from the rear-face side of the second substrate 60 at this time. Furthermore, by making light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73 contain, the glue line 56 with light emitting diode 42 can be made to be able to absorb a laser beam 73 much more well, and the glue line can be heated much more well. Therefore, a glue line with light emitting diode 42 can be heated alternatively efficiently.

[0083] Moreover, the electrode layer 57 which functions also as a shadow mask is arranged on the second substrate 60, and this electrode layer 57 is heated and you may make it heat a glue line 56 indirectly by irradiating a laser beam 73. The black chromium layer 58 is formed in the field of the side in which those who look at especially, the front face, i.e., image display device concerned, by the side of the screen of the electrode layer 57, are. The rate of energy-absorbing in the black chromium layer 58 is both highly carried out to if the contrast of an image can be raised by doing in this way, and a glue line 56 can harden early by the laser beam 73 irradiated alternatively.

[0084] Drawing 15 is drawing showing the condition of having made the second substrate 60 arranging the light emitting diodes 42, 61, and 62 of three colors of RGB, and having applied the insulating layer 59. The adsorber 53 used by drawing 13 and drawing 14 is used as it is, and if it mounts only by shifting the location mounted on the second substrate 60 in the location of the color, the pitch as a pixel can form the pixel which consists of three color while it has been fixed. As an insulating layer 59, a transparence epoxy adhesive, UV hardening mold adhesives, polyimide, etc. can be used. The light emitting diodes 42, 61, and 62 of three colors do not necessarily need to be the same configurations. Although red light emitting diode 61 is made into the structure where it does not have the layer of the hexagon-head drill GaN and other light emitting diodes 42 and 62 differ from the configuration of those in drawing 13 , in this phase, each light emitting diodes 42, 61, and 62 are covered by the glue line 45 which already consists of resin as a resin formation chip, and the same handling is realized in spite of the difference in component structure.

[0085] Drawing 16 is drawing showing a wiring formation process. It is drawing which formed openings 65, 66, 67, 68, 69, and 70 in the insulating layer 59, and formed the wiring 63, 64, and 71 which connects the electrode layer 57 for wiring of the second substrate 60 with the anode

of light emitting diodes 42, 61, and 62, and the electrode pad of a cathode. Since area of the electrode pads 46 and 49 of light emitting diodes 42, 61, and 62 is enlarged, opening, i.e., the beer hall, formed at this time, a beer hall configuration is large and can be formed in a coarse precision compared with the beer hall which also forms the location precision of a beer hall in each light emitting diode directly. The beer hall at this time can form an abbreviation phi20micrometer thing to the electrode pads 46 and 49 of about 60-micrometer angle. Moreover, although it connects with the thing linked to a wiring substrate, the thing linked to an anode electrode, and a cathode electrode, since the depth of a beer hall has three kinds of depth, it is controlled by the pulse number of laser, and it carries out opening of the optimal depth. Then, a protective layer is formed on wiring and the panel of an image display device is completed. At this time, a protective layer can use the same ingredients, such as the insulating layer 59 of drawing 14 , and a transparence epoxy adhesive. Heat hardening is carried out and this protective layer is completely a wrap about wiring. Then, a driver IC will be connected from wiring of a panel edge, and a drive panel will be manufactured.

[0086] Since the array approach of an above-mentioned light emitting device uses the imprint approach of the component of this invention, by making a glue line 56 contain light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73, it can heat efficiently a glue line with light emitting diode 42 alternatively, and can arrange light emitting diode 42 efficiently.

[0087] Furthermore, since a laser beam 73 is absorbed by light absorption material 56a which raises the absorption coefficient of the glue line 56 to a laser beam 73 and a laser beam 73 does not result in light emitting diode 42 by it, it is avoidable that a laser beam 73 damages light emitting diode 42. Therefore, it can arrange, without damaging light emitting diode 42 by the laser beam 73.

[0088] Moreover, since what is necessary is just to apply a glue line 56 completely by the imprint approach of the component of this invention after making a glue line 56 contain light absorption material 7a which selection is lost, becomes simple and raises the absorption coefficient of the glue line 56 to a laser beam 73 since there is no dependency of the component which is a candidate for an imprint, and the ingredient of a laser beam, light emitting diode 42 can be arranged according to a simple process.

[0089] And the time amount by which a laser beam 73 is irradiated by light emitting diode 42 with efficient heating of a glue line with light emitting diode 42 is short, and light emitting diode 42 can be arranged with a certainly sufficient precision, without exfoliation and a location gap arising in light emitting diodes other than the light emitting diode which is a candidate for an imprint, without affecting the fixing condition of other light emitting diodes, since a glue line with other light emitting diodes is not heated.

[0090] It becomes possible to form the electrode pads 46 and 49 with comparatively large size etc. using spacing between the components which already spread in the array approach of an above-mentioned light emitting device when light emitting diode 42 was made to hold to the member 43 for momentary maintenance in order to use an expansion imprint. Since wiring using the electrode pads 46 and 49 with these big comparison-size is performed, even if it is the case that the size of final equipment is remarkable and big, as compared with component

size, wiring can be formed easily. Moreover, handling becomes easy, in being able to extend the electric pads 46 and 49 to a large field compared with a component and advancing an imprint at the following second imprint process with an adsorption fixture, while being covered with the glue line 45 which the perimeter of a light emitting device hardened and being able to form the electric pads 46 and 49 with a sufficient precision by flattening.

[Translation done.]